BEEF 'N BACON

Alberta AGRICULTURE

A bimonthly publication from Alberta Agriculture Regional Offices in Barrhead and Red Deer

Odor Nuisance -- What's Being Done About it?

by Brian West

Not all is peaceful out in the Alberta country side! Odors from intensive livestock operations can create friction and conflict between neighbors. Research at the University of Alberta, funded by Engineering Services of Alberta Agriculture is determined to find out the why's and wherefore's of manure odors.

To date the study has created more questions than answers. At the present time opinion is mixed on a compound which can be measured and then correlated to total odor. Coumpounds suggested by some researchers as odor indictors are listed below.

Volatile Fatty Acids	Ammonia (NH_3)
p-cresol	Propionic acid
Skatole	Mercaptan
Hydrogen Sulphide H2S	Amines

Results from these trials so far are inconclusive, with the analytical results not being supported very well by what the nose senses. In other words, we are still missing the compound(s) that is the real indicator of piggery odor as experienced by the nose. Dr. Coleman at the Vegreville Environmental Centre has acquired some new analytical equipment designed to measure levels of sulphur compounds at threshold levels previously thought to be unattainable.

In addition to the work with manure additives, Dr. John Feddes at the University of Alberta, Agricultural Engineering Department has included a unique treatment of his own for testing. Showing particular promise is a treatment called oligolysis. A low voltage electrical current is passed across metal electrodes (iron bars) situated in the manure storage. The electrical current in combination with the iron bars precipitate out hydrogen sulphide in the form of iron sulphide. To date this treatment has been proven in the lab but now needs to be tried in a full size open manure storage. Considerable work will then need to be done to optimize the treatment for most economical operation.

Study at the university is attempting further work in this area.

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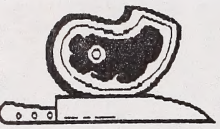

Bacon, Sausage and Luncheon Meats Being Designed for the NUTRITION conscious .....

by Aileen Whitmore

Interest in nutrition continues to increase and is currently recognized as an essential component of good health. Today nutritional advice to the public aids in the reduction of risk to chronic diseases such as cancer and cardiovascular disease in place of nutrient deficiency which is not viewed as a problem in Canada.

The new 1990 Nutrition Recommendations for Canadians are based on a combined review of nutrient requirements and nutrient/disease relationships. Nutrition Recommendations deal with dietary patterns that will provide nutrients in recommended amounts while minimizing the risk of chronic disease. The new guidelines are as follows:

Canada's Guidelines for Healthy Eating

- Enjoy a **VARIETY** of foods.
- Emphasize cereals, breads, other grain products, vegetables and fruits.
- Choose low-fat dairy products, lean meats, and foods prepared with little or no fat.
- Achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating.
- Limit salt, alcohol and caffeine.

The new guidelines together with consumer demand for lean and calorie-reduced foods have prompted changes in regulations affecting some pork products. They have been changed to permit new products to be produced with reduced fat. The regulation for cooked sausage, which includes franks, was altered to permit water to be substituted for fat. The old rules regulated water in the final product at four times the level of protein, plus 10 percent, with a maximum fat level of 30 percent.

Today there are a variety of processed meats available which are low in fat including cooked ham that contains less than four percent fat.

Sodium is also being resisted by consumers. It isn't necessarily harmful to healthy individuals but there doesn't seem to be any benefit from including measurable amounts in the diet. Today salt reduced bacon is available together with salt reduced processed meats. Consumers have to realize, however, that salt assures meat products of a long and safe shelf life. So when purchasing those that are salt-reduced look for the "Best Before" date and use before that date for best quality.

Beef 'n' Bacon is published by Alberta Agriculture offices in Red Deer and Barrhead. More information on all articles is available by contacting your District Agriculture Office or the following:

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Split Sex Feeding

by Bert Dening

Split sex feeding is feeding gilts and barrows separately with different rations. The advantages are in more efficient use of feed, a more even group of pigs and a better bottom line (more profit).

Barrows And Gilts Are Different

Boars, gilts and barrows differ in their potential and efficiency of producing lean meat. These differences are more apparent in the finishing stage than the growing stage. Table 1 shows the difference in performance between boars, gilts and barrows. The Canadian market does not accept boars for pork production so I will only refer to barrows and gilts.

Barrows eat more, put on more fat and less protein than gilts. Because of this, the nutrient requirements of barrows are different than gilts.

Table 2 gives the results of a typical situation where barrows grew faster and graded poorer than the gilts.

Feeding

When looking at average daily gain and carcass fat, barrows achieve their maximum index with about 10% less lysine in their diets than gilts.

Feeding the same diet to barrows and gilts (as in Table 2) results in either wasting protein on the barrows (if the protein is to high) or short changing the gilts if feeding a lower level of protein.

Practical Considerations

Whether you can feed barrows and gilts separately depends a lot on your feeding system. If you have separate lines on each side of a barn or if you hand feed, the feeding of separate groups would not be difficult. The size of your operation is also a factor. Larger operations with more facilities and more options in feeding would be able to split sex feed much easier.

Conclusion

Feeding a higher lysine diet (higher protein) to gilts more accurately meets their nutrient requirements and will better maximize the return per dollar invested in feed and facilities. Gilts are leaner and can maintain good grades at a heavier weight. Barrows deposit fat sooner and faster and should be marketed at a lighter weight.

Separate diets to barrows and gilts above 50-60 kg and shipping at different weights will make better use of feed and facilities and should maximize profit.

Table 1: Effects Of Sex On The Performance And Carcass Protein Accretions Rate Of Pigs From 60-100 Kg.

	Boar	Gilt	Barrow
Feed Intake (kg/d)(Ad lib)	3.2	3.4	3.7
Daily Gain (grams)	1180	1011	1060
Feed/Gain	2.7	3.3	3.5
Carcass Fat (g/kg)	242	302	328
Protein Deposition (g/d)	164	133	128

Campbell & Steele, unpublished data

Table 2: Comparison of Barrows And Gilts Fed The Same Diet On A Commercial Saskatchewan Farm

	Number	Market Weight	Days To Market	Carcass Index	Dressed Weight
Barrows	123	102	145	103	81
Gilts	113	100	150	106	80

Tips for Winterizing Your Barn

by Marvin Salomons

By now cold north winds are probably blowing down on your hog barns. More than likely many of you neglected to winterize your facilities. It is still not too late to try to reduce some of the problems and costs associated with keeping your pigs in a cozy environment for the next few months.

VENTILATION CHANGES

Improperly maintained facilities can increase energy costs. As weather changes or as animals move in and out of the barn, the barn temperature will fluctuate. A properly designed, adjusted and maintained ventilation system will keep these fluctuations to a minimum. During cold weather ventilation rates are on average 1/10 of those during summer. The following table outlines minimum winter ventilation rates for various parts of the facility.

Minimum Winter Continuous Ventilation Rates	
Gestation	10 cfm per sow
Lactation	15 cfm per sow and litter
Nursery	1.5 cfm per pig
Grower	2.5 cfm per pig
Finisher	4 cfm per pig

Tips For Winter-Proofing

The following tips will ensure your barn will survive the winter months and save you money.

1. Check fan blades, shutters, housing and controls. Shut off the system and clean units with a brush, vaccum or pressure washer.
2. Lubricate open bearings and bushings. Leave sealed control systems alone.
3. Use a toothbrush and a solution of mild soap and water to clean thermostat sensor bulbs or coils. Dirt buildup can cut efficiency of the controls by 15 to 25 percent. Check accuracy of sensors against an accurate thermometer.
4. All unnecessary openings in the barn should be sealed. Re-seal and re-caulk doors and foundations with latex or silicon caulking.
5. Summer cooling fans should either be removed or sealed from the inside. Simple, easy to construct styrofoam fan hoods can be installed on the inside of the barn. Contact your agricultural engineer for Canada Plan # ***M-9750 Ventilating and Heating Small Livestock Rooms.***
6. Energy will be wasted or the barn temperature will be too low if the fan is too large for the recommended ventilation rate. If the fan is too small the barn will become humid in the winter. Interlock heating and ventilation systems for maximum operating efficiency.
7. Check air inlets for warping and uneven seals. A low-volume fan installed in a recirculation duct under the inlets helps to prevent cold drafts dropping directly on pigs. Without a recirculation duct it is very difficult to achieve good air mixing. The recommended recirculation rate is 3/4 cfm/ft² of barn floor area. Ask your agricultural engineer for Canada Plan # ***M-9710 Fresh Air Inlets.***
8. Crawl up into the attic and check ceiling insulation for mouse damage and adequate coverage. If needed blow in extra insulation to achieve an R-value of 30. Wall insulation is equally important. This winter mark wall areas that show frost or condensation and repair next summer. Walls should have an R-value of 20. Consider installing rigid polystyrene or rigid fiberglass insulation around the perimeter of the foundation.
9. Make sure cold air inlets do not allow incoming air to freeze water lines. Check lines on outside walls and near fan openings.
10. Check manure drainage plugs and outlets. Making sure they won't freeze up is a lot easier now than at -40 ° C.

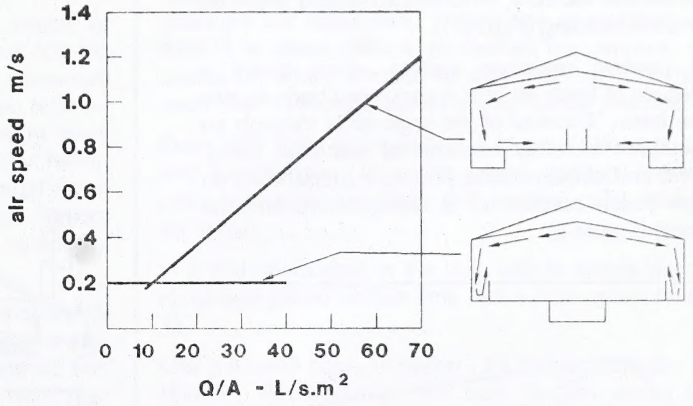
Floor Air Speeds in Swine Finisher Barns

by Robert Borg

Slot air inlets are designed to introduce air into a barn using high speed jets of air moving at 5m/s (1000 ft/minute). The energy of these jets allow fresh air to mix with air in the barn and dilute any contaminants. In spring, fall, and winter, air should not enter the pig lying zone until its temperature is above the lower critical temperature (LCT) of the pig. Air speed has a large influence on LCT. A winter air speed of 0.2 to 0 .3 m/s will minimize drafts while a summer air speed of 1 m/s will help cool the pig.

Air Speed and Ventilation Rate per Floor Area

These graphs show air speed at pig level as a function of Q/A - the ventilation rate per unit of floor area, a measure of inlet air energy.



Summer Ventilation

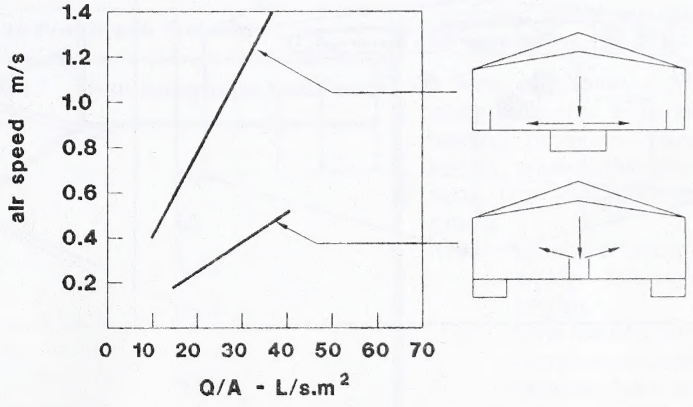
35 L/s per pig or

75 cfm per pig

Q/A is:

53 L/s per square meter

or 10.5 cfm/ft²



Winter Ventilation

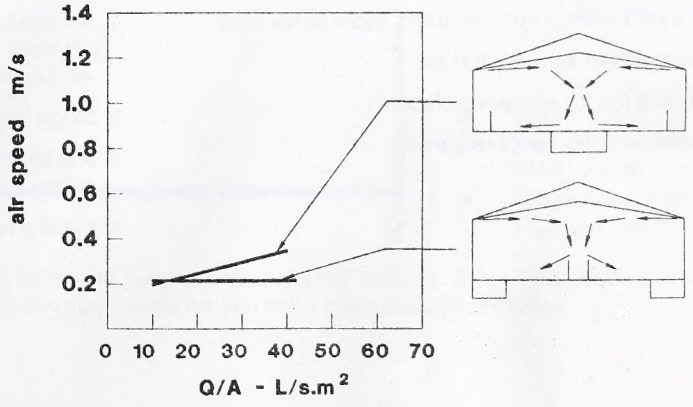
2 L/s per pig or

4 cfm per pig

Q/A is:

3 L/s per square meter

or 0.6 cfm/ft²



Data is from
J.M. Randalll,
AFRC Institute of
Engineering
Researh, U.K.

Ventilation Systems For Calving Barns

by Wayne Winchell

With the construction of insulated calving barns comes the need to also install a proper mechanical ventilation system. There are generally two types of systems to choose from:

1. A negative pressure system which has exhaust fans blowing air out of the barn which creates an interior vacuum. This in turn "sucks" fresh air into the building (Figure 1).
2. A positive pressure system which blows a mixture of fresh air and recirculated barn air into the barn. Exhaust of the stale air is through an insulated chimney because of warm air rising, wind and some positive pressure (depending on how much outside air is being blown into the barn) (Figure 2).

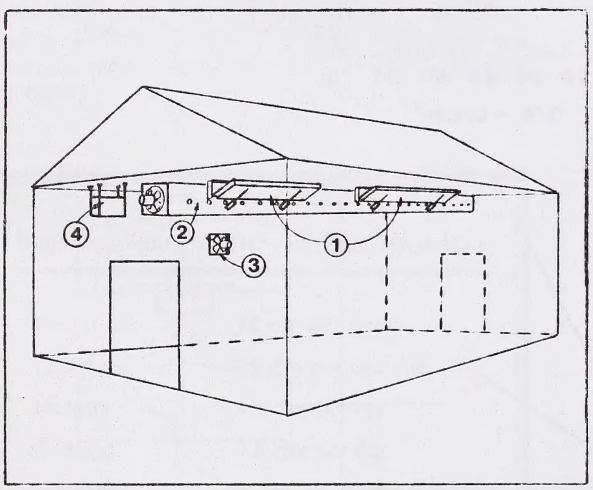


Figure 1 Negative Pressure

1. Counter-balance fresh air inlets (both sides of 2)
2. Recirculation air duct and fan
3. Exhaust fan for winter ventilation
4. Electric unit heater (if required)

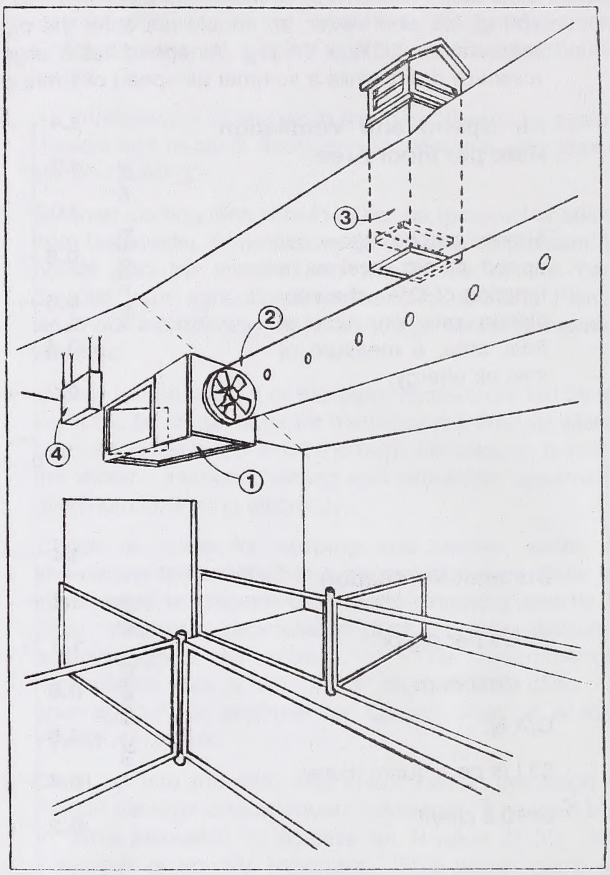


Figure 2 Positive Pressure

1. Air mixing chamber mounted on end wall with damper door to control amount of fresh outside air and amount of recirculated inside air
2. Single speed fan and plastic distribution duct
3. Insulated exhaust chimney with counter-balance baffle
4. Electric unit heater (if required)

Limit Feeding Beef Cattle

by Dale ZoBell

Everyone at one time or another has fed steers or heifers to gain at a particular rate but found that you exceeded the predicted gain considerably. This is good if only weight is the consideration, but often it is not. You may be trying to sell into a particular market and found you have missed the mark.

Replacement heifers are usually fed to reach a particular weight by a set date. For example a 550 lb. heifer is grown over a 200 day period with a predicted daily gain of 1.5 lb/day. If feed intakes are too high or the ration too hot they may gain more weight than anticipated which could end out with a fleshy heifer come breeding time. In this case gains could have been controlled by limit or restructed feeding. Putting out only the amount of feed needed for a specified weight gain.

This can also occur in backgrounding rations where you are trying to get growth but your intentions are to sell in the spring for the grass market. If gains are too high these cattle could be too heavy for that particular market or at the least be less attractive for prospective buyers. By feeding only the required feed for a predicted weight gain you can more easily achieve the desired weight gain.

Restricted feeding is accomplished more easily if total mixed rations are being fed versus the case where roughage and grain are fed separately. When hay or roughage is fed by itself it is often difficult to restrict the amount consumed unless an effort is made to only put out a certain portion each day. In every instance it may not be practical.

Even with high grain rations it is possible to control intake and weight gain. In a year where grain is relatively low in price relative to roughage limit feeding grain rations may be an option.

In a trial conducted in the U.S. 550 lb steers were full fed a roughage ration versus limit fed a high grain ration **(Table 1)**.

Using Alberta costs of barley - $1.75/bus., Silage - $25/ton + Premix - $200/Tonne - the cost of gain would have been $0.24/lb gain for the energy controlled steers and $0.35/lb gain for the high roughage full fed.

Table 1 Energy Controlled vs Roughage Full Fed

	Energy Controlled [1]	High Roughage Full Feed[2]
Initial wt	550	560
Days fed	92	92
ADG (lb)	2.15	1.82
Average feed intake (as fed-lbs)	18.9	35.9
Feed /gain	5.92	8.94
Cost of gain ($/cwt)	41.9	50.6
[1] Ration (as fed) Grain - 59.2% Silage - 38.2% Premix - 2.6%	**[2] Ration** Grain - 12.0% Silage - 76.7% Hay - 10.0% Premix - 1.3%	

It was suggested from this and other trials that high energy limit feeding programs have the following advantages over conventional high roughage grower programs:

- Grain is cheaper per unit of energy. This reduces cost of gain.
- Limit feeding minimizes negative associative effects between grain and roughage.
- Limit feeding permits the feeder to prescribe a gain to match frame and condition of cattle.
- Limit feeding reduces bunk cleaning, feed waste and feed hauling.
- Cattle adapt faster to their finishing ration.

In order for this to work for you, you must know the requirements of your animal. If not knowledgeable in this area consult with a qualified nutritionist. This program may not be for you but it does have possibilities.

Grinding or Rolling Oats

by Robert Hand

The abundance of cheap oat grain in Alberta raises questions about its feed value and whether processing is required. One rule of thumb is if the cost of processing is greater than 10% of the value of oats, then processing is questionable but the age of the animal also influences the decision whether to process or not.

The comments in this article are particular to oats. Other grains such as wheat and barley show marked depressions in digestibility and feed conversion efficiency when fed whole. The soft, fibrous shell of the oat kernel allows for easier chewing and easier access of the rumen micro organisms to the starch within the kernel.

CALVES

It appears that the digestive benefits to grinding or rolling oat grain for calves is small. According to research, with 800 lb. steers fed 9 lbs. of either whole or rolled oats, the digestibility was only improved by 6% **(table 1)** and only 7% of the whole grain fed was passed in the manure. Further, whole grains recovered from the manure was lighter than those fed. This low level of grain passage may be because the calves intake was restricted or the oat moisture was higher than average.

Table 1 Digestibility Differences Between Whole & Rolled Oats (Toland, 1976)

	Whole	Rolled	% Improvement
Digestibility	76.7	81.0	5.6

But as the calf gets older, the amount of whole grain passing in the manure increases and digestibility is reduced **(table 2)**. This age effect could be related to the size of the opening into the omasum

Table 2 Effect of Age on Digestibility of Whole Oats (Morgan and Camp - ling, 1978)

	Age (months)			
	7	10	13	16
Digestibility	63.3	58.3	53.3	51.4
% passed whole	16	17.5	25.5	24.6

(the third stomach) or due to differences in chewing. Both factors likely have some effect. A younger calf is more efficient at chewing than an older calf. In fact, yearling steers could spend up to twice as long chewing grain than cows.

Two feeding trials from South Dakota showed no difference in gain or feed conversion efficiency for whole or processed oats when fed at about 5 pounds to backgrounding calves **(table 3)**. Unfortunately, I was unable to find feed efficiency trials for feedlot calves on higher levels of oats.

Table 3 Effect of Processing or Gain and Conversion (Embray and Oberbay, 1976)

	Initial	Whole		Processed	
	Weight	ADG	FCE	ADG	FCE
Trial 1	425	1.44	15.1	1.42	15.2
Trial 2	550	1.57	12.5	1.45	12.9

COWS

Oat grain fed to cows should be either ground or rolled, regardless of the level of grain fed. Experiments show that between 27.5 to 41% of the total oat grain fed is passed whole in the manure. The digestibility of whole oats is reduced by some 30% as compared to rolled oats for cows. In order to be digested in the rumen, the cows must break open the whole kernels by chewing. It appears that up to 59% of the consumed grain is broken up by chewing. Unfortunately, the remainder goes undigested.

PRACTICAL

- It is questionable whether oats should be ground or rolled for backgrounding calves up to 1 year of age. We may wish, however, to process oats so that feed ingredients such as minerals or vitamins do not separate out of the mix.
- Although there is little information available for feedlot calves, one would suggest that oats should be coarsely ground or rolled since feed conversion may be affected and many feedlot calves are older.
- If fed to cows, oats should be ground or rolled.

BEEF 'N' BACON

Alberta AGRICULTURE

Growth Implants Are Safe

by Ross Gould

The meat inspection system screens over 10,000 beef carcasses per year for residues of antibiotics, pesticides and growth implants. In the past three years there has not been a single beef carcass exceeding the "Maximum Residue Level" for Ralgro in meat tissue.

Growth implants are of two types: those that contain natural hormones "Compudose, Synovex, Steeroid, Heiferoid" and those that contain a synthetic fermentation product "Ralgro".

Natural Hormone Implants

The natural hormone implants are not distinguishable from the estradiol, progesterone, and testosterone which the animal produces daily. The average estrogen level in a 100 gram serving of beef from unimplanted steers is 1.3 nanograms (billionth of a gram) and 1.6 to 2.4 nanograms from implanted steers. Many other natural plant and animal foods have higher estrogen levels. A glass of whole milk contains 75 nanograms. A 100 gram serving of coleslaw contains 2,400 to 2,600 nanograms. The extra hormones in meat are unimportant by comparison.

Everybody produces estrogen and testosterone hormones. A man produces from 40,000 to 75,000 nanograms while a woman can produce up to several million nanograms of estrogen per day depending on the stage of the menstrual cycle or pregnancy. Again the extra hormones from the meat is not significant.

Synthetic Implants

Residue from Ralgro is detectable in the meat. Before being registered Ralgro was tested to ensure that it was safe for both the animals and the people who consume the animal products.

The "Maximum Residue Level" for Ralgro in meat tissue was found at five days after implanting. It was over 230 times below the "Maximum Residue Level". Most cattle are slaughtered several weeks after being implanted. At that time, residue levels are 690 times below the "Maximum Residue Level".

The strict Canadian registration requirements for growth implants and our vigorous meat inspection system help ensure that our food is safe.

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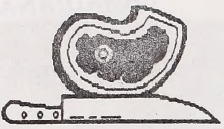

Look Beyond the Headlines

by Aileen Whitmore

Once again red meat has hit the headlines as a cause of cancer. A recently published article in the New England Journal of Medicine outlines the details of a ten-year study of more than 88,000 nurses. The study concludes that daily cnsumption of red meat more than coubles your risk of colon cancer. The data suggests dietary fat in the red meat contributes to at least one form of cancer, and the more meat consumed the greater the risk.

Before jumping to any conclusions it is useful to review some statistics. The study divided the nurses into various groups and found that those who ate beef, pork or lamb as a main dish "more than once a day" suffered 2.49 more cases of colon cancer than those who said they ate meat "less than once a month". When the actual numbers are examined there is very little difference in the incidence of cancer. The daily meat eaters, totalling 30,240 had 16 cases of colon cancer. The 64,345 less-than-once-a-monthers had 4 cases. Of the entire group, 150 developed colon cancer. One researcher has proposed that if you looked at any random sample of almost any same-sized group, there's a good chance you would find the same number of cases of colon cancer.

To date no study exists that supports a "cause-and-effect relationship between normal consumption of red meat and colon cancer".

It is also important to note that there is a tendency for the public to assume that all red meat is high in fat. The fact is that in the decade since the research project was started, the fat content in red meat has been reduced by 27% in beef and 31% in pork in the United States. Canadian meat is even leaner by 10 to 15%. Feeding practices in Canada coupled with breeding technologies have produced cattle that are significantly lower in fat.

Nutrition experts generally agree that the total fat ir. the diet should be reduced. It does seem unfair to concentrate on red meat when the real problem is the total fat in the diet from any source. National nutrition guidelines recommend a reduction in fat to 30% total calories.

To date no study exists that supports a "cause-and-effect relationship between normal consumption of red meat and colon cancer."

Today lean cuts of beef and pork are not considered to be high fat foods. Compared to 20 years ago many cuts are 40-50% leaner. Coupled with the fact that red meat is a source of iron and zinc that is readily utilized by the body it remains a wise food choice and like all other food choices should be eaten in moderation.

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Grading for Top Dollar

by Bert Dening

Effective Janaury 1, 1991, the Alberta hog carcass grading/settlement system has been changed. The new system will force producers to ship their hogs in a tighter weight range or face severe financial penalties.

The New System

Table 1 was the system used until December 31, 1990 and Table 2 shows the current system. The old system had 17 yield classes while the new system has 7.

The big difference that could affect your pocket book is the grading of light hogs. A hog dressing out at 67 kg (85 kg [187 lb] live) with a yield class 5 on the old system would have graded 100. This same hog on the new system would be yield class 3 and would grade 85 which is a 15% reduction in price.

Financial Implications

The above hog at a market price of $1.40/kg dressed would return $93.80 with the old system and $79.73 with the new system for a difference of $14.07.

If this same hog was 72 kg dressed (91 kg [200 lb] live) and the same yield class (5 old, 3 new), it would have a grade of 106 in the old system and 101 on the the new system. This difference would be $5.00 per hog in favor of the old system in a $1.40 market.

If this hog was 76 kg dressed (96 kg [212 lb] live), with the same yield class, (5 old, 3 new) it would have a grade of 108 in the old sytem and 110 with the new system. This difference would be $2.00 per hog in favor of the new system.

An 82 kg dressed hog (104 kg [228 lb] live) with the yield class (5 old, 3 new) would differ by $3.00 per hog in favor of the new sytem in a $1.40 market.

The Bottom Line

Buy a good scale and use it! Never market hogs below 97 kg (214 lb) live weight. Evaluate the new grading table to determine the best weight range to ship your hogs.

Table 1 The Canadian Hog Carcass Grading/Settlement System (yield class 13 - 17 not shown)

Weight Class kg		1	2	3	4	5	6	7	8	9	10
Yield Class	Estimated % Lean Yield	40 - 59.99	60 - 64.99	65 - 69.99	70 - 74.99	75 - 79.99	80 - 84.99	85 - 89.99	90 - 94.99	95 - 99.99	100+
1	>53.6	80	100	106	112	114	113	111	108	100	81
2	52.8-53.59	80	98	105	111	113	112	109	107	98	81
3	52.0-52.79	80	97	103	109	112	111	108	105	97	81
4	51.2-51.99	80	95	101	107	110	109	107	103	95	81
5	50.4-51.19	80	93	100	106	108	107	106	102	92	81
6	49.6-50.39	80	92	98	104	107	106	104	100	90	81
7	48.8-49.59	80	90	96	102	105	104	102	97	87	81
8	48.0-48.79	80	89	95	101	103	102	101	95	83	81
9	47.2-47.99	80	88	93	99	102	101	99	92	82	81
10	46.4-47.19	80	87	91	97	100	99	97	90	82	81
11	45.6-46.39	80	86	89	96	98	97	96	88	82	81
12	44.8-45.59	80	85	88	94	97	96	94	85	82	81

Table 2 The Alberta Hog Carcass Grading/Settlement System

Weight Class kg		1	2	3	4	5	6	7	8	9
Yield Class	Estimated % Lean Yield	less 64.99	65 - 69.99	70 - 74.99	75 - 79.99	80 - 84.99	85 - 89.99	90 - 94.99	95 - 99.99	100 plus
1	>53.59	80	85	107	114	114	112	107	101	81
2	52.0 - 53.59	80	85	104	112	112	110	104	97	81
3	50.4 - 51.99	80	85	101	110	110	108	100	93	81
4	48.8 - 50.39	80	83	98	107	107	105	96	89	81
5	47.2 - 48.79	80	83	96	104	104	101	92	82	81
6	45.6 - 47.19	80	82	94	100	100	97	88	82	81
7	<45.6	80	82	90	96	96	94	82	82	81

Barn Air Quality Matters

by Marvin Salomons

Over the past years pig production has moved from outside lots to indoor confinement facilities. This movement has required producers to learn how to manage manure storage and cope with more pigs in less space. The change has also forced producers to maintain good air quality in these enclosed environments.

What's in the air?

Poor air quality can hurt pig health and performance, shorten building and equipment life, and even endanger the health and safety of workers in the barn. Air quality is governed by what types of contaminants are found in the air. Aerial contaminants fall into two general categories: Manure gases and airborne particles or dust. When anaerobic bacteria break down manure the most prevalent gases are ammonia, hydrogen sulphide, volatile organic acids and other sulphur-containing compounds. In addition carbon monoxide produced by heating equipment and carbon dioxide produced mainly by pigs can also cause problems.

Airborne dust contains foreign protein (ie. skin fragments), grain dust, insect parts, fecal dust, bacteria, mold spores, ammonia and endotoxins. Research has shown that much of the dust does not originate from feed and that dust particles can carry gases and penetrate deep lung tissue where it affects animal health.

Levels of exposure

Many organizations, as shown in the table, are introducing legislation to limit the exposure of workers to noxious gases and dust.

Other experts in this field such as Dr. Kelly Donham, Iowa suggest tougher limits should be set. He recommends maximum allowable concentrations for respirable dust be 0.23 mg/m^3 and for ammonia be 7 ppm. Regardless, research has shown that in pigs long term exposure to 25 ppm ammonia induces respiratory problems and that at 50 ppm reductions in performance and health are evident.

Controlling Problems

Several features in barn design and management techniques can be used to control gases and dust.

- Properly maintained and vented heating units reduce potential carbon monoxide problems.
- Store manure for short periods and minimize agitation on removal. Minimize air circulation over pits.
- Minimize ammonia production by keeping floors and slats dry and free of manure and urine.
- Check carbon dioxide level as it is a good indicator of air quality and ventilation effectiveness (below 3000 ppm).
- Practice good housekeeping. Consider vacuuming to remove dust. Adding oil to feed has been shown to reduce larger dust particles but not respirable ones.

Maximum Exposure Limits

Gas	8-hr. exposure
Ammonia	25 ppm
Carbon dioxide	0.5%
Carbon monoxide	50 ppm
Hydrogen sulphide	10 ppm
Dust	**Upper limit**
Inhalable	10 mg/m^3
Respirable	5 mg/m^3

British Health Safety Executive, 1989.

Choosing a Heat Exchanger

by Robert Borg

PAMI and the Manitoba Department of Agriculture have just evaluated six heat exchangers or heat recovery ventilators. They were installed in three hog feeder barns, one calf barn, and two chicken barns. The complete results are printed in Evaluation Report 619, 'Heat Recovery Ventilators' available from the Alberta Farm Machinery Research Centre in Lethbridge, (329-1212).

Heat exchangers transfer some of the heat from moist exhaust air to the fresh air coming into the barn. Two applications for heat exchangers are:

1. Supply supplemental heat for barns without heating systems /**OR**
2. Save energy in barns with heating systems and preheat cold winter air.

The PAMI test results are shown below.

Barns with no supplemental heat

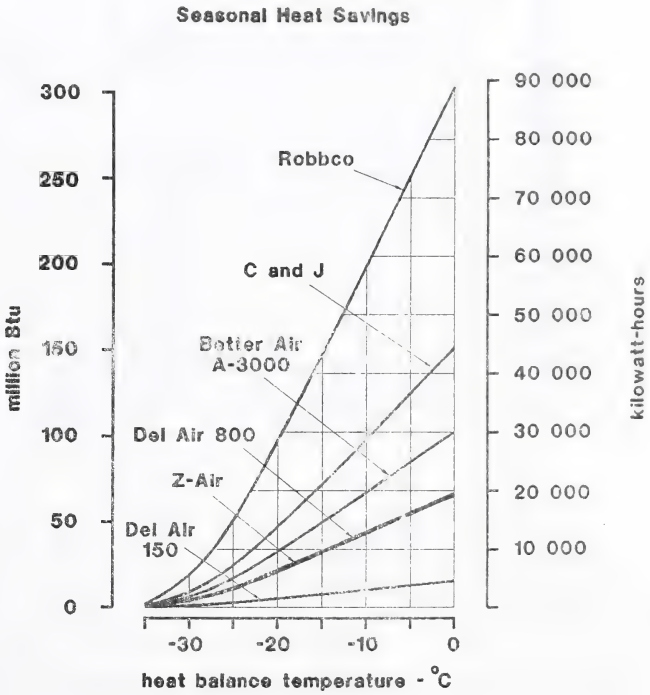
Choose a heat exchanger with enough capacity to heat the barn if the heat exchanger is the only heat source.

	Heat Recovery (Btu/hr) at-30°C	Exhaust Air (cfm)	Supply Air (cfm)	Cost
Better Air A-3000	51,600	1,260	875	$3,000
C and J Jones MC II	81,000	1,500	1,500	$2,695
Del-Air A-150	8,100	190	125	$1,095
Del-Air A-800	36,500	980	590	$1,950
Robbco A1-3500-BIK	144,000	4,600	3,200	$3,286
Z-Air Model 74-60-1	29,800	950	820	$3,197

The C and J Jones model is the core only, it did not come with fans. Prices shown are f.o.b. Humboldt, Saskatchewan.

Barns with supplemental heat

The amount of energy saved depends on a barn's heat balance temperature. At temperatures below the heat balance temperature, the animals no longer produce enough heat to keep the barn warm. The heat balance temperature is the outside temperature when you have to turn the heaters on. The heat saving shown in the graph uses a barn temperature of 20° C and 20 years of Winnipeg weather data.

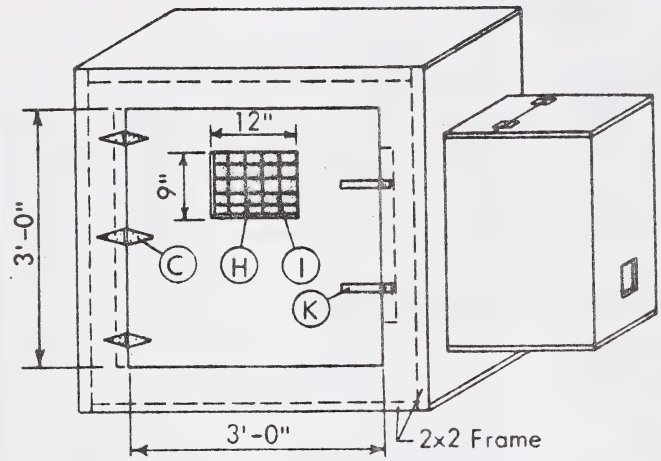


Example: The heat balance temperature of a barn is -10°C and the heat exchanger saves 44 million Btu or 13,000 kW-hr over the heating season. How much money do you save each year?

If natural gas costs $3.00 per GJ or million Btu and is 75% efficient, the cost is 44x$3.00/.75=$176.00. If electricity at $.05/kWhr is used at 100% efficiency, the saving is 13,000x$.05=$650.00.

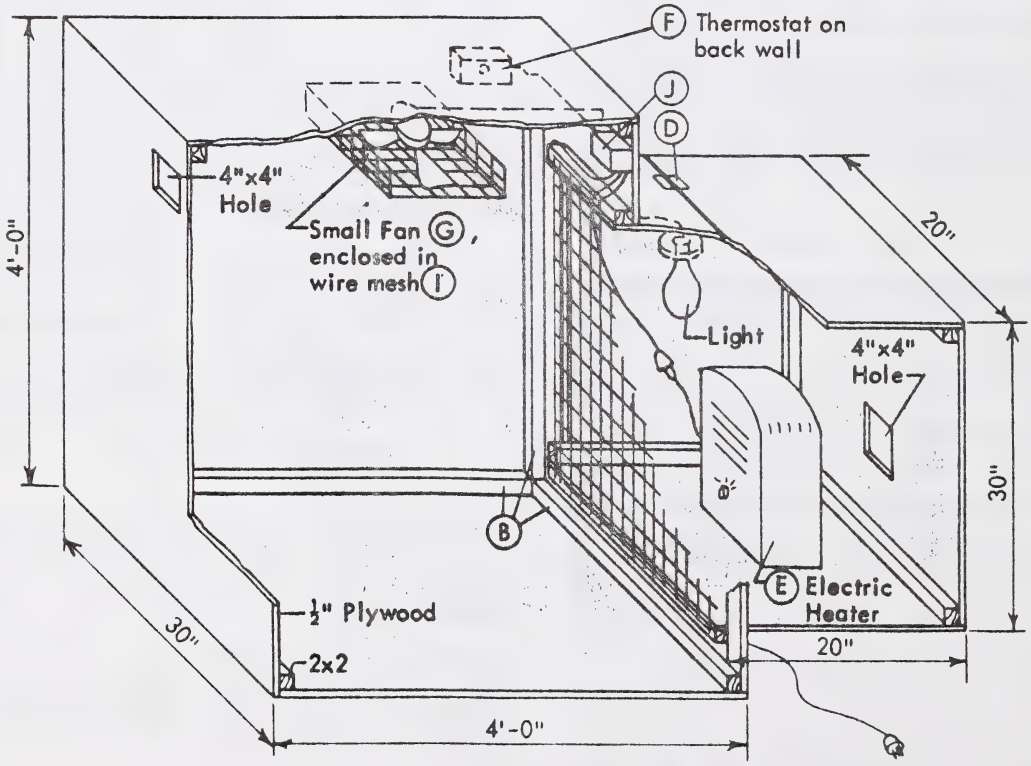
Calf Warming and Drying Box

by Wayne Winchell



BILL OF MATERIALS

Item	No.	Description
A	3	½" x 4' x 8' plywood
B	11	2x2 x 8'
C	3	4" strap hinge
D	2	2" strap hinge
E	1	1300-1600 watt electric heater with fan
F	1	Thermostat (heat range in excess of 100°F)
G	1	Small fan
H	1	9" x 12" window glass
I	1	30" x 60" heavy wire mesh
J	1	Switch box (3 switches: fan, heat, & light)
K	2	6" barrel bolt door latch
	20ft	Electrical wire (12 ga- conductor + ground)
	3lb	6d nails



Should Hay be Ground?

by Dale ZoBell

Work conducted at the Agriculture Canada Research Station at Melfort, Saskatchewan indicated that self feeding chopped or ground hay to growing steers improved feed intake, rate of gain and feed efficiency compared to calves fed unprocessed hay. They were not sure, however, if this was due to increased intake, grinding or both. As a result a trial was conducted over 3 years to determine this.

Feed intake was limited to allow for 0.45 kg per head per day on 285 kg. hereford steer calves over 180 days. The ration was 70% roughage (hay and straw), 20% grain and 10% of a protein, mineral, Vit. A and antibiotic supplement. Following the trial the calves were placed on pasture and gains monitored to determine if there was a carryover effect of the ration on rate of gain.

Effect of Processing on Performance of Steer Calves *

	Lot # 1	Lot # 2	Lot # 3	Lot # 4
	Fed long forage	Fed chopped forage	Ration ground (.8 cm screen)	Ration pelleted (.5 cm die)
No. of calves	24	24	24	24
Initial kg	284	285	285	287
ADG (kg)	.45	.46	.46	.45
Dry matter intake (kg)	5.32	5.45	5.59	5.23
Feed/gain	11.6	12.0	12.2	11.6
ADG on pasture	.92	.95	.91	.90

* Average over 3 years

These results indicated that by increasing the surface area of the forage to digestive forces by grinding, the hay did not increase animal performance. This may be due to the fact that processed feeds pass more quickly through the digestive tract resulting in reduced digested nutrients compared to unprocessed hay.

Differences in rate of gain on pasture were very small between all treatments showing no advantage to processing the ration.

It was concluded that processing the forage component of the ration is only beneficial when it results in a significant increase in intake, and should not be done when the livestock involved can meet their nutritional requirements on unprocessed hay.

For cattle where high rates of gain are desired and hay is an economic alternative, processing should be considered; particularly where total mixed rations are fed and intake becomes critical for optimum production.

Lower the Risk of Scours

by Rob Hand and Dr. Jim Lawrence*

Management Practise	Lower the Risk by:	The Risk is Higher When:
Calf Equipment - nipple feeders, stomach tubes, pails, newborn calf feeders, bolus guns, needles.	Every calving season replace the bolus gun, stomach tubes, feeders or at least sanitize thoroughly. Use new needles.	Use of last years equipment without sanitizing or replacing. Use of one bolus gun for scouring calves and calves with other sicknesses.
Use of Drugs and Vaccines	Discard all expired drugs and vaccines, read labels thoroughly and follow directions. Develop a vaccination and treatment schedule.	Use of out-dated and/or improper storage of drugs and vaccines. Improper injection sites, not following directions, improper dosage.
Calf Treatment	Isolate sick calves and treat separately. Do not treat scouring calves before working with healthy newborns. Sanitize clothes, boots and hands thoroughly after treating scouring calves.	Treat without removing from herd or treat in the same barn as newborns or calving cows. People can transmit scours to healthy calves by treating scoured calves first.
Purchase of Foster Calves	Do not allow calves from other farms on your farm during the calving season.	Foster auction market or other farm calves onto cows losing their own calf.
Cow Nutrition	Cows with a condition score of 3 and on a balanced ration including selenium, vitamin ADE, and fortified salt.	Cows with a condition score of 2 or less. No additional selenium or vitamin ADE, red or blue salt fed.
Age of cow	Older than 2 years	First calving two year olds.
Calving Difficulty	Unassisted, vigorous calf.	Prolonged delivery, hard pull, hypothermic or weak calves
When First Calf Heifers Calve	Heifer should calve before cows and in a separate area from mature cows.	Heifers calving with cows
When Calf Received Colostrum	Calf receives colostrum in first 4 to 6 hours of life and have frozen colostrum stored in one liter bags.	Greater than 6 hours after birth, no frozen colostrum in storage, no calf monitoring for first suckle.
Calving Location	Separate, clean, spacious calving areas, with calf shelters, wind breaks and snow removed to dry soil for exposure to the sun.	Confined to cow wintering area, wet, poor draining areas, rotating each cow through the barn to calf.
Calf Shelter	Abundant dry bedding, high front so sun reaches back, deep for wind protection, moved regularily.	No shelter and/or wet and contaminated bedding or shelter at inappropriate location for calves.
Cows udder and underline	Clean, free of manure.	Wet, manure contaminated.
Calving Groups	20 - 40 head per pen with greater than 2,000 square feet per head.	Greater than 40 head in the same pen or less than 2,000 square feet per head.

* Westlock Veterinary Clinic

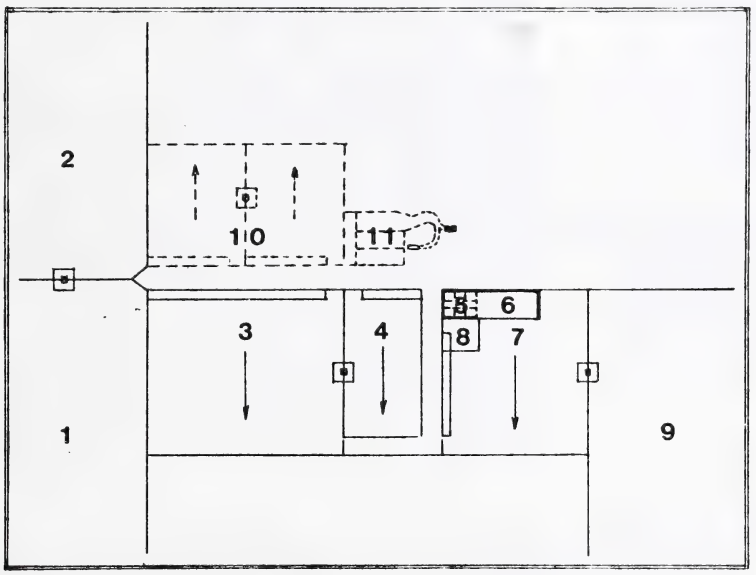
BEEF 'N' BACON

A bimonthly publication from Alberta Agriculture Regional Offices in Barrhead and Red Deer

Recommendations For Adequate Calving Facilities

by Wayne Winchell

In an attempt to minimize scour problems during the winter and spring calving season as well as improve the handling and cattle flow, this layout points out some of the basic pen requirements to keep in mind when planning your cow-calf facilities.



Legend: (Basic 100 cow herd)

1. Winter cow feeding area/pasture
2. Winter bred heifer feeding area/pasture
3. Pre-calving cow observation pen (minimum 400 ft²/animal
4. Pre-calving bred heifer observation pen (minimum 400 ft²/animal)
5. Calving barn (with treatment pen)
6. Post calving open front shelter
7. Post calving pen (2 to 10 days) (minimum 750 ft²/animal)
8. Problem pen
9. Post calving feeding area/pasture (minimum 10 acres:may need 2 such areas in case of scour outbreak)
10. Heifer calf/steer winter feeding pen(s)
11. Handling facilities

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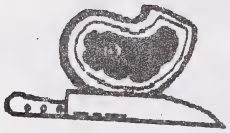

Many Factors Influence Consumers

by Aileen Whitmore

Anyone interested in promoting animal products, from producer to retailer, must have an interest in consumption trends. A key to success is to meet consumers needs and to meet those needs, consumers behavior and attitudes must be understood.

There are some interesting paradoxes in consumer behavior which warrant analysis. For example, a reason often cited for the decline in red meat consumption and the simultaneous increase in chicken consumption is that the public is concerned about the amount of fat, cholesterol and calories in the diet. The irony is the tremendous popularity of breaded, deep-fried chicken products in the fast-food industry.

The table below shows the nutrient content of a serving of lean beef, plain roast chicken and chicken nuggets. It further illustrates inconsistent consumer behavior.

Nutrient Content of Beef, Roast Chicken and Chicken Nuggets

Parameter	Beef Round Steak cooked lean (one serving)	Roast chicken meat only (one serving)	Chicken Nuggets* (one serving of six pieces)
Weight (g)	88	92	109
Energy (kcal)	144	154	323
Protein (g)	26	23	19.1
Fat (g)	3	6	21.3
Energy form fat (%)	19%	35%	59%
Cholesterol (mg)	57	69	73

* Pennington (1989) Health and Welfare Canada (1988)

The beef and chicken both have less than 200 kcal, that is 144 and 154, respectively, while the nuggets have 323 kcal. For fat, the lean beef does well with 3 g, supplying 19% of the calories; the chicken also rates well with 6 g or 35% of calories. But the nuggets had much more fat, 21.3 g or 59% of calories. So if consumers really want a heathy diet, they should eat plain beef or chicken, not a deep fried product. Thus, there must be other factors influencing consumer behavior besides health concerns.

One researcher has found that while dietary restrictions for health reasons did indeed exert a lot of influence on consumer food use, the most significant factor was how popular that food was with the family. Other factors that determined food use were how suitable it is to serve to guests, time required for preparation and cost.

It appears that although health concerns are an important issue in consumer food selection, other factors are also significant. A problem with the health issue is that the public is confused. Canadians are being exposed to incomplete conflicting and sometimes misleading information about animal products, nutrition and health. Many don't realize how complex the issue is and that it is still unresolved. Controversy remains about the role of dietary cholesterol in heart disease, for example.

Recommendations for addressing the health issue are: first, educate the general public and health professionals to eliminate misconceptions and misinterpretations about animal products; second, stress the positive health aspects of animal products. With more research and education, the public concern that animal products may be a hazard to health will likely moderate itself.

Beef 'n' Bacon is published by Alberta Agriculture offices in Red Deer and Barrhead. More information on all articles is available by contacting your District Agriculture Office or the following:

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How Fine To Grind

by Bert Dening

In general the finer you grind feed the more efficiently a hog uses it. But if you get too fine the problems with ulcers increase.

So How Fine Should You Grind?

Fineness of grind is related to screen size (hole diameter), screen condition (wear), hammer condition, tip clearance, tip speed, grade variety and type, moisture, and many more factors. I will discuss only screen size and hammer condition which are the major factors.

Research has found that an average particle size of 700 - 800 microns gives the best feed efficiency and lowest level of ulcers. 700 - 800 microns is 70 - 80% of a millimeter or .7 - .8 millimeter. Generally as you get below 500 microns the level of gastric ulcers increases.

The coarser the grain (barley, oats) the greater the improvement in feed efficiency with finer grinding. Table 1 shows the results of work at Kansas State University. Table 1 shows an improvement in feed efficiency from 3.58 down to 3.32 as screen size decreased from 3/16 of an inch to 1/8 of an inch. This is an improvement of 8% which is statistically significant. The same study done with starter pigs showed a 5% improvement with a 1/8 inch screen. Young pigs chew their food much better so the effect of finer grinding is not as great. Going from a 2/16 (1/8) inch screen to a 3/16 doesn't sound like much but the area of the whole is 2.25 times as big in a 3/16 inch screen. A 5/32 (2.5/16) inch screen is 1.6 times as big as a 1/8 (2/16) inch screen.

Table 1 also shows an improvement in average daily gain at 9% going from a 3/16 to a 1/8 inch screen, this is also statistically significant.

Wheat

Wheat becomes flour very quickly if too small a screen is used. One study showed that going from a 8/64 (1/8) inch screen to a 7/64 inch screen with hard red spring wheat caused the number of particles per gram to go from 246,800 particles per gram to 961,490 particles per gram. In other words the wheat quickly became flour and flour is very difficult to eat because it gums up in the animals mouth.

Conclusion

- Keep hammers and screens as sharp as possible and replace when worn.
- A 1/8 inch screen is probably the best size for all grains giving optimum feed efficiency and reduced ulcers.

An improvement in feed efficiency of 8% by just reducing particle size could save 6 - 8,000 dollars in a 100 sow farrow to finish operation producing 2000 pigs per year. Reducing particle size is a quick, easy and cheap method of improving profitability in your operation.

Table 1: **Effect of Barley Particle Size in Finishing Diets**

Item	Grain:	Barley	Barley	Barley	Barley
	Screen size, inches:	1/8	3/16	1/4	Rolled
	Particle size, microns:	714	902	1,146	2,206
Average daily gain, lbs.		1.96[a]	1.80[b]	1.78[b]	1.74[b]
Average daily feed intake, lbs.		6.49[b]	6.21[b]	6.51[b]	6.50[b]
Feed efficiency		3.32[a]	3.58[b]	3.65[b]	3.72[b]

[ab] Means on the same row with different superscripts differ (P<.02).
Goodband et al., 1985.

Identifying Improved Profit Sources

by Marvin Salomons

Determining cash and pig flow is an excellent way pig producers can assess the financial success of their business. The calculations can be made to determine the status of an existing operation or projected to assess the feasibility of a proposed enterprise. In today's world the use of computers has made this task a lot easier. Computerized cash and pig flow models effortlessly do the repetitious calculations and allow one to view the effect of changes in inputs on the bottom line instantaneously.

Setting Up A Model

Cash and pig flow computer models can be used to demonstrate the effects of improvements in management and productivity on the profitability of a pig operation. In the following example and as also shown by *Model A* in **Table 1** a model with these main parameters was calculated:

- 220 sow farrow to finish unit.
- 4073 pigs sold per year.
- debt load of $315,000 at 9% over 20 years.
- wage expenses of $60,000 per year.
- current feed, veterinary, utilities, etc, costs.
- net margin of $54,443.00 per year.

Table 1

Improving Profits in a 220 Sow Unit

Parameter	Model A	Model B	Increase in Net Margin (B minus A)
Litters/sow/year	2.2	2.3	$11,341
Pigs born alive/litter	10.5	11.5	$24,468
Preweaning deaths	15.0%	10.0%	$15,504
Nursery deaths	2.0%	1.0%	$3,194
Grower deaths	1.0%	0.5%	$1,866
Finisher deaths	1.0%	0.5%	$2,610
Days to slaughter	175	170	$7,944
Feed conversion	3.1	3.0	$5,893
Carcass index	105	106	$5,016
Total increase in net margin			$77,836

Improving Profits

Improvements in production parameters from *Model A* (original) to *Model B* can have a significant effect on increasing the profitability on net margin of this pig unit **(Table 1).** For example, improving one parameter such as reducing preweaning death loss by 5.0% can increase profit by $15,504 per year. This is an achievable target for any unit. Improving all the parameters as shown by *Model B* will increase profit by an extra $77,836 per year. Although in practice improving all these parameters simultaneously is achievable, selecting one or two goals to target at any one time is more realistic.

Table 2

Value of Additional Pig Produced

Parameter Improved	Increase in Net Margin	Increase in Pigs Sold	Value of Extra Pig
+0.1 litter/sow/yr	$11,341	188	$60.32
+1.0 pigs born alive	$24,468	395	$61.94
-5.0% preweaning death	$15,504	244	$63.54
-1.0% nursery deaths	$3,194	42	$76.05
-0.5% grower deaths	$1866	22	$84.82
-0.5% finisher deaths	$2,610	22	$118.64

An Opportunity Margin

The extra pig that is produced by these improvements in production and management is of considerable value to the unit. These extra pigs can be considered an *opportunity margin.* If we do not lose the pig we sell it for slaughter at approximately $125 each. If we lose the pig we also lose the profit margin plus lose the feed and other associated costs incurred in raising that pig. As shown in **Table 2** each extra pig raised as a result of reducing preweaning mortality by 5.0% is worth an extra $76.05 to the unit. The closer that pig is to slaughter weight the more valuable it becomes.

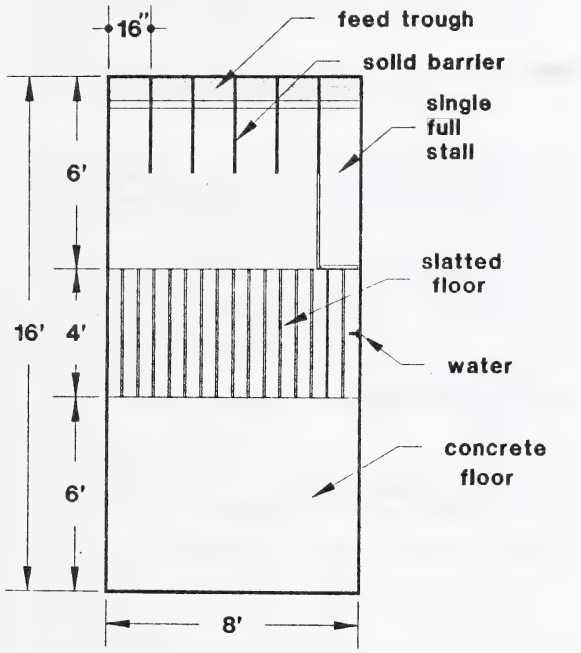
Group Gestation Pens With Individual Feeding

by Robert Borg

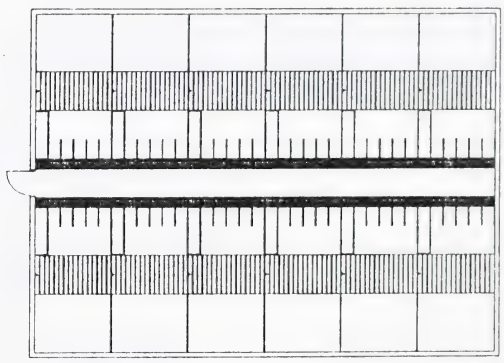
The University of Queensland in Australia recently ran behavioural trials with groups of sows housed in gestation pens designed with partial barriers along the feed trough. The diagrams show a barn layout using a pen designed for groups of six sows.

The partial solid barriers between the sows at the feed trough reduces aggression at feeding time. The feed stalls also act as resting areas or as secure hiding areas for some sows, especially on the first day that a group is introduced to the pen. Pigs maintain a personal space, pigs intruding into this space cause aggressive behaviour. The visual barriers or hiding places are effective because pigs maintain their personal field or space in front of their faces.

A single full stall in the pen provides an area for pregnancy testing, veterinary treatment, and confining disruptive sows.



The design shown in the diagram and the barn layout is a compromise, allowing individual feeding and group housing with a reasonable cost and space requirement.



	Advantages	Disadvantages
Use of stalls or tethers	supervision, care and feeding to sow's needs	- welfare concerns - reproductive concerns
Change to group housing		-aggression - poor feed distribution
Group housing with individual feeding		- cost - space requirements increase
Change to electronic feeding		- cost - loss of transponder collars

Software for Computerized Swine Management

by Fred Schuld

An increasing proportion of swine farmers now use computers for keeping management records. This article lists some of the choices available for producers considering acquisitions of such aids. Any final decisions should be made by checking with sellers, examining the program operation, speaking with persons who are using the program. These should be tested against what you want the software to do and whether the cost, time and resources needed are justified by the results expected.

Following is a list of Common Swine Management Software used in Alberta (Not complete)

Name (alphabetically)	**Available From**	**Hardware Needs**	**Cost ***
Easicare Pig Data Systems	National Pig Development Co. Ltd. 633 Park St., Regina, Sask. (306)-721-2034 FAX: 721-2528	Hard drive, 40 MEG 640 K RAM, IBM compatible	$1400 + $300/yr service
H.M. Boot Pig Management System	EBOR Swine Systems, RR1, Blackfalds, AB (403)-748-3831	Hard drive, 10 MEG 640 K RAM, IBM compatible	est. $1500
PigChamp	Swine Graphics P.O. Box 518, Webster City, Iowa 50595 (515)-832-2286 FAX: 349-3065	Hard drive and 1 floppy, IBM compatible, DOS 2.0 or greater 640 K RAM	$1200, data shared, $1500, non-shared
Pork Manager, Pork Finisher	Agristar Computer Services Ltd. #408, 9707-110 St. Edmonton, Ab (403)-488-1502 FAX: 482-1241	2 floppies or 1 hard drive (recommended) IBM compatible	$475 $149
Professional Swine Records	422 3rd St. Graceville, Minnesota 56240 (612)-748-7322 FAX 748-7136	Hard drive, 640 K RAM, IBM compatible DOS 3.01 + printer (Bureau service available)	$815
Swine TRAX Recordkeeping TRAK Plus	Doane Information Services 8800 Queen Ave. S. BLCSIZ,Bloomington, Minnesota, 55431 (612)-921-6342 FAX: 921-6869	Hard drive, and 640 K RAM printer, IBM Compatible	$465 $930

Others - PIGTAILS is a bureau mail-in only service of Pig Improvement (Canada) Ltd. at PIGTAILS, Box 237, Acme, AB TOM OAO, tel. 546-4475. Cost is $0.83 per sow per month or $10 per sow per year.

Iowa State University-Extension Software Services, tel. (515)-294-8648 has hog templates. These generally require spreadsheet software costing $400 to $600 such as Lotus 1-2-3, Symphony, Appleworks, Visicalc, Quattro Pro, Supercalc, Excel and others. The cost of the spreadsheet will be minimal or it can be developed by the user if he is knowledgeable with the spreadsheet software.

*Prices quoted are latest given and where US vendors quoted in US funds, these were converted to Canadian funds at US $1.00 = CAN $1.20.

The above systems will all be present at a computer clinic at the Alberta Pork Congress in Red Deer, June 11, 12 & 13, 1991.

Frequency Feeding of Feedlot Steers

by Dale ZoBell

Efficient feedlot production utilizes a number of production techniques to optimize all available resources. Proper feeds and nutrition are two aspects of these resources and play a major role in determining the subsequent animal performance.

Traditionally it has been accepted that the delivery of feeds in a modern feedlot occurs once per day for most rations. Many managers feel it is not economically advantageous to feed more times than this, as additional weight gains that may occcur from feeding more than once per day would not offset higher labor and operating costs.

Little information is available on this subject. A Colorado study, however, reported no difference in average daily gain (ADG) or feed efficiency (FE) when steers were fed twice per day, once per day in the afternoon, skipped one feeding every fourth day or suffered occasional feed-bunk crowding.

A study conducted in Central Alberta, on growing and finishing steers, showed similar results to the one in Colorado.

Traditionally it has been accepted that the delivery of feeds in a modern feedlot occurs once per day for most rations.

One hundred and twenty commercial crossbred steers, with initial weights of 617 lbs, were allocated to three treatments consisting of feeding the same quantity of feed at one feeding (R1), two feedings (R2) or at three feedings (R3) per day.

In the growing phase, a standard growing ration of 48.5% barley silage, 49.6% high moisture barley (HMB) and 1.9% premix (dry matter basis) was used. The finishing diet consisted of 8.6% barley silage, 90% HMB and 1.4% premix (dry matter basis).

Results indicated there was no statistical difference between treatments for the growing or finishing periods for ADG, dry matter intake (DMI) or FE. Feed efficiency data is shown in the following table.

Feed Efficiency for Steers Fed Once, Twice or Three Times Per Day *

Treatment	Period		
	Growing (112 days)	Finishing (84 days)	Total (196 days)
R1	7.56	8.19	7.82
R2	7.91	8.24	8.04
R3	7.52	8.79	8.06

*ZoBell et al 1990

From this trial it was concluded there was no economical advantage to feeding growing or finishing steers more than once per day. Only where overcrowding or ration (high roughage) constraints may limit the ability to feed the desired amount, should cattle be fed more than once per day. If further information is required contact the author or your nearest Alberta Agriculture Office.

Cattle Production and Methane Gas

by Rob Hand

Each year domestic cattle produce an estimated 74 million tonnes of methane globally. That represents 14% of the total annual methane emissions. Another 2% of the methane emissions come from the anaerobic decomposition of animal waste. These figures were reported by Dr. Don Johnson and his associate researchers from Colorado State University at the 1991 Southwest Nutrition Conference in Arizona.

Most methane occurs when organic matter decomposes in an oxygen free environment such as the rumen in cattle. Methane is the second most important greenhouse gas next to carbon dioxide and could account for 16 to 18% of the global warming over the next century. Thirty percent of the total 540 million tonnes of methane produced annually comes from natural sources such as wetlands, swamps, wild animals, termites, oceans, lakes, and the tundra. But the majority of methane emissions arise from human associated activities such as the growing of rice, production of fossils fuels, landfills and even the rearing of domestic animals. The 74 million tonnes of methane from domestic predominantly ruminant animals is significant but pales when compared to the volume of greenhouse gases released burning fossil fuels to support our modern mobile lifestyle.

Methane is produced in the rumen of beef and dairy cows when bacteria and protozoa digest the cellulose in forages. The unwanted gas is then belched out the esophagus. The actual methane loss is dependent on the level of intake and the digestibility of the feed. Ruminant methane losses are from 5.5 to 6.5% of the total dietary energy intake when cattle are grazing or eating high forage diets. Feedlot cattle fed high grain diets have methane losses as low as 2.5% but commonly average 3.5% after allowing for adaptation to the high grain diet.

Ruminant methane losses are from 5.5 to 6.5% of the total dietary energy intake

Management changes which increase feed efficiency or reduce maintenance requirements will likely affect methane losses. Methane losses can be modestly reduced by:

- the use of ionophores such as Rumensin, Bovatec, or Posistac
- choosing diets which increase the level of soluble carbohydrates by harvesting forages earlier, feeding higher quality forages, and including starchy feeds like grain in the diet.
- increasing productive efficiency by feeding a balanced diet, using growth promotants, and utilizing complementary breeding programs.

The four fold increase in cattle numbers over the last century has been only one of several contributors responsible for the increase in atmospheric methane. But calculations show that the methane produced from ruminants would only account for 2% of the global warming over the next 50 to 100 years. A 25% reduction in ruminal methane would be expected to reduce warming by only 1.1%. That compares to an 8% reduction in global warming if the auto industry increased fuel efficiency to 40 miles per gallon.

The rather small reduction in the greenhouse effect from a major reduction in cattle numbers must be balanced against the fact that ruminants are able to convert pasture and forage crops to human food. They make meat and milk from forages grown on poorer quality land which may not be suitable for cultivation. Of the worlds agricultural land, 68% is in native range or perennial forage crops. Alberta has 50% of its agricultural land in this category. Obviously the cattle industry is responsible for some of the increase in methane but other factors have more influence on global warming.

BEEF 'N BACON

A bimonthly publication from Alberta Agriculture Regional Offices in Barrhead and Red Deer

Surface Water Quality for Cattle

by Bob Buchanan

During the summer months most cattle producers rely on surface water sources for their cattle on pasture. Dugouts, sloughs and creeks are all common pasture water supplies. Although a dependable water supply is important so is the water quality.

Surface water sources are especially susceptible to contamination from chemical substances washed in during the spring and summer runoff. Agricultural, industrial and petroleum based chemicals can be toxic and interfere with cattle health, milk production, growth rates and reproduction. Some types of blue green algae are also toxic to cattle. Toxic substances can also cause subcellar damage that lead to increased susceptibility to disease or parasitic invasion.

Some physical and chemical properties of water can also affect its palatability (taste) and suitability for cattle. Excessive levels of salinity, hardness, color, turbidity, bad taste and odour and bacteria contamination can all deteriorate water quality. Poor tasting water can cause cattle to drink less and reduce feed intake which in turn reduces production.

A few important recommendations pertaining to cattle and water quality are:

- **Observe** the cattle and water source regularly during the summer.
- **Test the water** - if there are any signs of chemical contamination.
- **Control blue green algae** growth with treatments of copper sulphate (bluestone) Blue green algae appear like grass clippings in the water.
- **Pump water** to the cattle wherever possible to protect the water source and improve water quality. It's no surprise that cattle actually prefer drinking from a stock tank rather than wading to their bellies in mud for a drink.

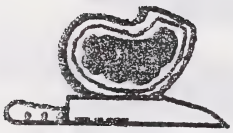
Remember good water quality is important. It maybe your next step in improving cattle production.

5

In This Issue

Vol. 6, No. ~~4~~, May 1991

Alberta



Moderation and Variety are Keys to Healthy Eating

by Aileen Whitmore

Health claims labelling is an important issue to many people. Claims for foods that suggest certain foods are magic and could cure or prevent disease are among the most well-known, far-reaching and fraudulent activities in medicine and health.

Nowhere is the rising interest of the public in health more evident than in the area of the foods they choose to eat. As part of the movement to improve lifestyles, many people are paying more attention to nutrition, especially since many prestigious scientific institutions such as the Heart and Stroke Foundation of Canada and the Canadian Cancer Society have given their approval to the notion that there is a relationship between diet and several chronic diseases. Canada's Guidelines for Healthy Eating (1991) are also based on a largely growing body of scientific information that suggests, but doesn't prove, such relationships.

The increase in the visibility and credibility of nutrition over the last few years has resulted in many more people seeking information and advice about their diets. The response has been quick and overwhelming, with an overload of misinformation at times accompanied by sound scientific advice. Consequently, the provision of nutrition information to the public - how much, by whom and in what form and manner - has become a critical and confusing issue.

Current scientific understanding about the cause and effect relationship between diet and specific disease is often incomplete and frequently controversial in the scientific community. A single food or class of foods can't and shouldn't be expected to have a visible impact on chronic degenerative diseases. Foods become important only when considered in the context of total diet and then over an extended period of time.

Selecting foods in moderation rather than avoiding certain foods or food groups is a key principle when following Canada's Guidelines for Healthy Eating (1991).

CANADA'S GUIDELINES for HEALTHY EATING (1991)

- Enjoy a **VARIETY** of Foods
- Emphasize cereals, breads, other grain products, vegetables and fruits.
- Choose lower-fat dairy products, leaner meats, and foods prepared with little or no fat.
- Achieve and maintain a healthy body weight by enjoying regular physical activity and healthy eating.
- Limit salt, alcohol and caffeine.

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Hot Weather Management

by Bert Dening

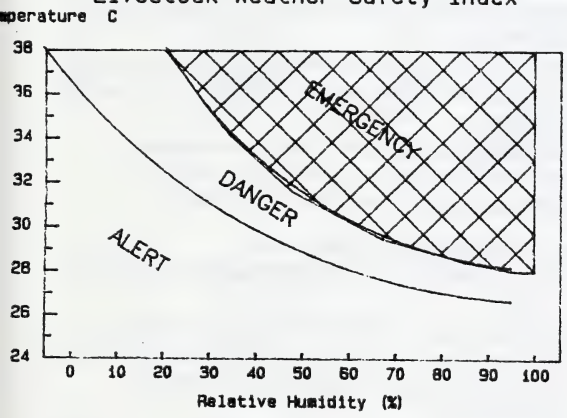
In sunny Alberta there are many crowded and underventilated barns which along with warm weather from May to August can have a detrimental affect on performance.

Temperature and Humidity

Figure 1 shows the relationship between temperature and relative humidity. High temperatures and high relative humidity is a dangerous situation because the pig cannot become dry and it is the wetting and then drying effect that causes evaporation and cooling.

From figure 1 we see that at 60% relative humidity slightly over 27 C temperature puts the pigs in the danger zone and this is a common situation in the middle of a summer afternoon in many barns.

Livestock Weather Safety Index



Economic Loss

Figure 2 shows that the best temperature for best appetite, highest daily gain and lowest feed efficiency is around 21 C. As you get over 25 C the economic loss starts getting very high.

In many farms a vicious cycle starts to occur around May. As the temperature rises animals loose some appetite, growth slows and crowding increases. As crowding increases the effective temperature rises.

Our new grading table encouraging heavier weights could cause even worse crowding in 1991. People are keeping pigs an extra week or two which means 4 to 8 percent more pigs on the farm.

Summers Losses

Temperature	Daily feed Intake	Daily Gain	Feed Efficiency
at 10 degrees C	7.7	1.76	4.37 to 1
at 15 degrees C	6.93	1.74	3.99 to 1
at 20 degrees C	7.09	1.87	3.79 to 1
at 25 degrees C	5.78	1.58	3.65 to 1
at 30 degrees C	4.87	0.98	4.91 to 1
at 35 degrees C	3.33	0.68	4.87 to 1

Source:Kansas State Univ.

What Can Be Done

Stocking density! Pigs require .8 to 1 square foot for every 20 lbs body weight. A market weight pig of 225 lbs (102 kg) needs 9 to 11 square feet. 9 square feet is okay in the winter but 10 to 11 should be given in the summer.

Using these figures determine how many pigs your barn should hold in summer and winter and keep it at that level and either sell extra pigs as feeders, finish extra pigs outside or build onto the barn.

Keep pigs cool! Consider a sprinkler system in the barn. These systems are relatively inexpensive. Sprinklers are better than misters because a mist just settles on the hair but drops from a sprinkler will reach the skin. Do not sprinkle constantly because pigs need to dry off and then be wetted again in order for cooling to be effective. Two minutes on and 8 minutes off is a good rule of thumb. Chilling is just as bad as over heating so put the spirnkler on a thermostat.

Provide Water! One water nipple per 15 pigs and at least two per pen.

Hot weather ration! Temperatures above 25 C cause reduced feed intake. 3 to 8 percent fat or oil in the diet can help hold energy intake steady as consumption falls.

Conclusion

Remember heat equals stress and crowding equals stress and both together equals more than twice the stress and that equals less gain and efficiency. With our best yearly hog prices in late spring and summer using a common sense approach to hot weather management can reduce stress and get more pigs to market at peak prices.

High-Tech Liquid Feeding

by Marvin Salomons

Wet or liquid feeding pigs has been practiced for many years. Its origins in the cheese-making areas of northern Europe was brought on as a means of utilizing and mixing whey by-products with dry feed components like barley. By the early 1960's various mechanical liquid mixing and distribution systems had been developed. With the advent of computerization these systems have now become sophisticated feeding methods in many pig units.

How Does It Work?

The nerve center of a modern computerized liquid feeding system is the computer control panel. This panel comprises the high-tech circuitry relaying information and instructions of the diets to be mixed, the feeding destinations, and the amounts and times these diets are to be fed. A computer, monitor, printer, alarm, and modem can be added to the system to monitor, input or retrieve information on feeding schedules and useage for a particular pig or group of pigs.

Table 1 Effect of Feeding Systems on Pig Performance (33 to 88 kg weight)

Feeding System	Daily Gain (g/day)	Feed Efficiency
Liquid, trough, restricted	736 *ab*	2.86 *a*
Meal, floor, restricted	686 *c*	3.07 *bc*
Pellets, floor, restricted	718 *bc*	2.92 *a*
Meal, hopper, ad-lib	717 *bc*	3.07 *bc*
Pellets, hopper, ad-lib	767 *a*	2.93 *ab*
Meal, hopper, restricted	683 *c*	3.11 *c*
S.E.M.	15.6	0.05

Patterson, 1989.

Liquid feed is pumped from the mixing tank (often called the kitchen) through plastic lines to a pen, a gestation stall or group of stalls, or to a farrowing crate. Feed can be dispensed using hand-operated valves but in most cases is done by the computer via air-controlled valves. Most units feed grower-finisher pigs their daily allotments in a long trough according to a preprogrammed feed curve. Alternately, an ad-lib feeding system using small troughs equipped with sensors continuously keeps feed available to pigs until their designated daily allottments are consumed. Liquid feeding is not recommended for pigs weighing less than 20 kg.

Is It Worth Looking At?

A review of the literature shows that improvements associated with liquid feeding over dry is between 6 to 15% for both growth rates and feed conversion. The results of a recent study of feeding systems at the Agricultural Research Institute of Northern Ireland are shown in ***Table 1***

Major Advantages Observed:

- More palatable feed leads to increased feed intake, faster growth rates and better feed efficiencies.
- Better record and control using feed intake curves and feed consumption information.
- Less competition at the trough results in more uniform pigs.
- Less barn dust. Health checks are easily made by herdsperson following the feeding cycle through the barn.
- Potential to use by-products plus a variety of different formulas and feeding schedules.
- Fewer long-term mechanical problems.

Major Disadvantages Observed:

- Trough space increases pen space requirements by 10%
- Although pigs can be fed manually using the system, computer down-time is critical. Herdspeople are generally unable to repair electrical components.
- Most operations experience teething problems the first six months. Must be willing to work with new technology.

What's the Cost?

The cost of a complete computerized liquid feed system compares favorably with an equivalent computerized on-farm dry feed mixing and distribution system. Quotes from two of the three dealers in Alberta price a liquid system for a 220 sow farrow to finish unit at $110,000 and a dry system at $120,000. Added installation costs for the liquid system compared to the dry system are slightly higher at $50,000 versus $40,000 respect- ively. To date, 16 computerized liquid feeding systems are in Alberta swine units (11 in Hutterite units) ranging from 200 sows to 1600 sows farrow to finish.

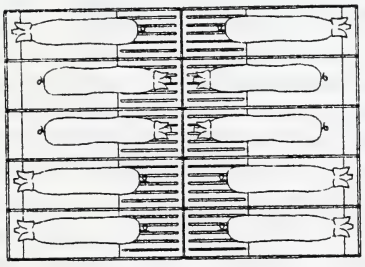
Turn Around Dry Sow Stalls

by Robert Borg

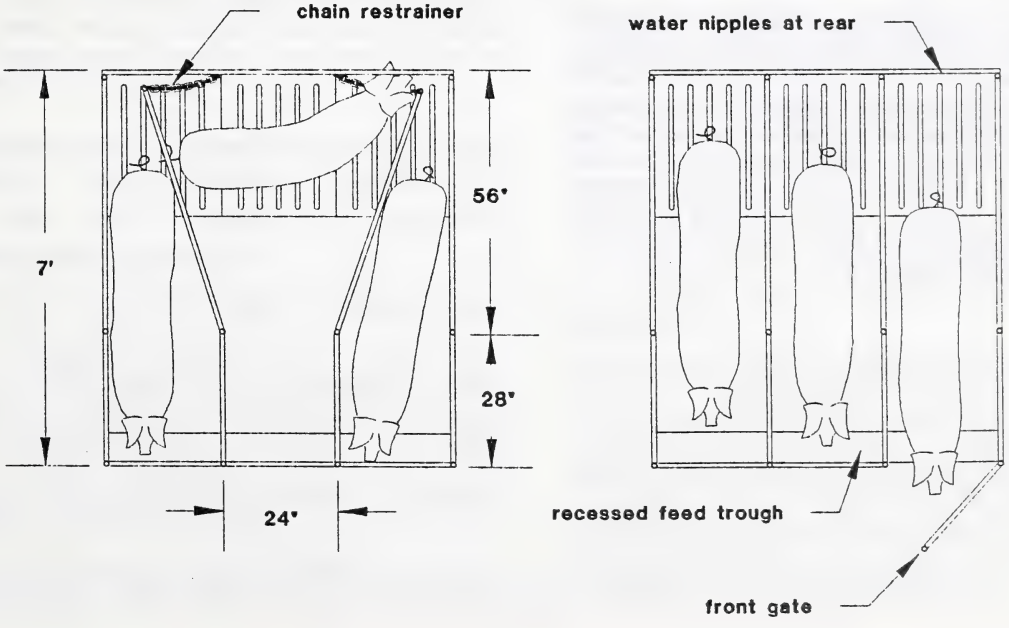
Sows, given the freedom to turn, will turn around nearly 24 times a day in stalls with hinged partitions. A sow turns in the stall by borrowing space from her neighbor. If a sow borrows space from both neighbours she can increase the width at the rear of the stall to 72" or increase the stall space by 70%.

Research by Stan Curtis at the University of Illinois proved that the stalls stay clean and dry. Water nipples are located at the rear. Manure is worked through the slats better with the increased sow movement.

If you place the stalls back to back, possible as each stall needs only one access gate, you can reduce barn space by 10%. Also, as many as 10 sows, 5 on each side will sometimes turn face to face and socialize. One drawback may involve pregnancy checking when sows are facing different directions. A commercial version of this stall is sold by Moorman Manufacturing Co. in Illinois.



	Weight of Sow				
	120 kg 260 lb	140 kg 310 lb	160 kg 350 lb	180 kg 400 lb	200 kg 440 lb
Body length	53"	56"	58"	60"	62"
Add 20% length to allow the sow room to stand up without restriction	63"	67"	70"	72"	75"
Minimum stall width to allow the sow to turn around	30"	31"	33"	34"	35"



Multipurpose Platform Scale

by Wayne Winchell

As the marketing of cattle becomes more and more involved, it is becoming advantageous to have your own weigh scale on your farm. These can take the form of the small individual scales (usually portable) or a "group" or platform scale. Both sizes of scales can either be the mechanical, balance beam style or the more common electronic load cell style.

The individual scales are appropriate for those producers requiring a lot of single animal weighings. The group scale can be utilized for other purposes such as weighing groups of animals, weighing bales, feed wagons, trucks, grain, or just about anything else you can think of.

These platform scales are usually either 10' x12', 10' x20', or 10' x30'. The load cells and monitor make up the basic package. The deck (steel and wood or concrete) can also be purchased or can be home made. The load cells and deck are installed on concrete pilings or grade beams above grade (no scale pit required). A livestock cage also has to be installed.

The electronic monitors can be either a low cost (about $600) unit that cannot be licensed for trade, or they can be the more expensive units (about $1200) that can be certified. Both types of monitors can be in a weatherproof case (NEMA) or a non-weatherproof case. These electronic monitors are usually remote from the scale and they need to operate in above freezing temperatures to ensure accuracy. Thus, they can be in a simple plywood box with a heat lamp or they can be in an insulated, heated building.

The costs of these group scales, installed on concrete with the deck, monitor and cage, run from about $6000 to $20,000, depending on size, custom options and the firm they were purchased from. If the scales are to be certified for legal trade, calibration, certification and a power surge protector will add about $750 to $1000 to the total cost. Certification is done through Canadian Consumer and Corporate Affairs, Weights and Measures Device Inspections.

Group scales are handled by the following firms:

- Prairie Systems - Saskatoon
- Accurate Scales Industries Ltd. - Edmonton
- Pacific Industrial Scale Company Ltd. - Edmonton
- Precision Scale Company Ltd. - Edmonton
- Ancoma Ltd. - Edmonton
- Dial Scale Company Ltd. - Edmonton

Pasture Bloat in Cattle

by Dale ZoBell

Most cattle producers at one time or another have experienced a pasture bloat condition. This can be very frustrating, stressful and costly, but if the conditions that predispose cattle to bloat are understood a lot of the frustration and stress can be cut down. In a new publication put out by Agriculture Canada, titled "Bloat in Cattle", pasture bloat is discussed.

Current theories of bloat place emphasis on the involvement of small particles and microbial activity. Alfalfa, which is rapidly digested, also provides for bacterial blooms, producing larger quantities of both gas and slime. The presence of a readily digested feedstuff (fresh immature alfalfa) and the abundance of small particles in the rumen content results in gas bubbles trapped in the slime - particle mix which produces the frothy bloat.

The highest risk pasture forages are: alfalfa, sweet, red, white and alsike clover as well as winter wheat. Bloat safe forages are: sainfoin, birdsfoot trefoil, cicer milkvetch, fall rye and most perennial grasses.

Crop maturity is the most important factor in preventing pasture bloat. Bloat potency is highest at the vegetative (or prebloom) stage, decreasing progressively, as the plant grows and matures.

Uniform and regular intake is the key to managing animals on legume pastures.

Alfalfas' potential for causing bloat is highest when moisture conditions are optimal for vegetative growth. Under these conditions, the stems become turgid and fleshy but not fibrous; the leaves are soft and easily crushed between the fingers. The bloat potential of alfalfa is reduced when soil moisture is insufficient because of either drought or salinity.

It is common practice to seed pastures to a grass-legume mixture. In rolling terrain the ratio of grasses to legumes can change and the potential for bloat increases. Additionally under a rotational grazing situation it is necessary to ensure all paddocks are uniform in grass to legume ratios so that at rotation cattle do not gorge themselves on particular species, such as a lush immature legume.

An ideal companion grass should have the same seasonal growth patterns and regrowth characteristics as alfalfa. Sometimes ideal growing conditions at seeding result in a new alfalfa - grass mixture with too much alfalfa. It may be necessary to defer grazing during the spring flush of growth or to restrict grazing to a portion of the field. With the new electric fencing technology available it is a simple task to graze whatever areas are desired and is readily adaptable to any situation.

Uniform and regular intake is the key to managing animals on legume pastures. Before animals are placed on a legume pasture they should be fed coarse hay to satiety. This prevents them from gorging themselves and overeating fresh and lush legume forage. Thereafter they should remain on pasture. The animals may experience mild bloat on first exposure, but the problem should disappear in a few days due to adaptation.

Bloat is often associated with discontinuous grazing such as removal from a legume pasture for a period of time. This can also occur when grazing is interrupted by storms, biting flies or other reasons.

Animal susceptibility to pasture bloat is considered to be a heritable trait. For this reason it is a good practice to cull known bloat - susceptible animals from a breeding herd.

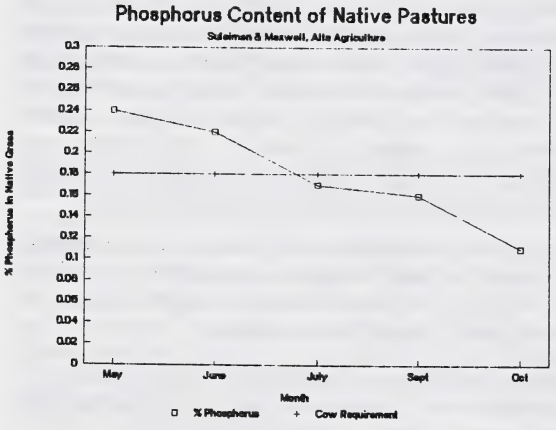
It seems everyone has a remedy for bloat treatment or prevention. Presently there are products either on the market or in developmental stages which are or will be available to producers. Before purchasing any product consult with your veterinarian who can discuss with you your particular situation and needs. No one wants to experience bloat, but as we continually reach for greater heights in productivity it will be with us. So heres to a successful bloat free grazing season.

Minerals on Pasture

by Rob Hand

Pasture forages are good sources of calcium, phosphorus, and some trace minerals. But given the productivity of today's livestock, it is necessary to supplement minerals to basically all species.

Calcium phosphorus minerals are required to cover deficiencies in pasture dry matter consumed. As an example, the phosphorus content of grasses and legumes is relatively high in the spring and declines as the plant matures such that by mid July the phosphorus content may be below breeding cow requirements. This is especially true for native grasses. Thus a phosphorus deficient diet can occur mid way through the breeding season. It has been demonstrated supplying phosphorus on pasture to breeding cows will increase fall pregnancy rates by 10 to 15 %. For grazing yearlings, gains can also be increased.



On grass or legume pastures the mineral should contain equal parts of calcium and phosphorus. These minerals are usually termed "range mineral" and can be purchased with or without added salt. In addition to calcium and phosphorus range minerals contain certain trace minerals such as copper, zinc, manganese and selenium.

Alberta pastures may be up to 93 % inadequate in copper, 69 % inadequate in manganese, 94 % inadequate in zinc, and 66 % inadequate in selenium. These inadequacies occur in all regions of Alberta. According to Alberta Agriculture nutritionist, Dale Engstrom, a trace mineral supplementation program should supply 80 to 100 % of the animals total requirement. Any surplus amounts of trace minerals that may be provided by the pasture will do no harm and will help offset individual animal variation in requirements and supplement intake. Supplementing trace minerals is relatively low cost and safe since supplements must be approved.

Recomended Trace Mineral Content of Salt and Mineral MIxes

Trace Mineral	Product Level (mg/kg)
copper	2,000 to 4,000
manganese	5,000 to 10,000
zinc	8,000 to 12,000
selenium	25 to 75
cobalt	40 to 60
iodine	100 to 200

The advantages of supplementing the beef cow herd with trace minerals may not be visually obvious. Potentially, trace mineral supplementation could alleviate sub optimal breeding performance. A cow might conceive one heat cycle earlier. Similarly sucking calves or grazing yearlings could have increased gains. A pasture trial at Sundre with cow-calf pairs demonstrated that suckling calves gained an extra 11 pounds when supplemented with trace minerals. At Thorhild, trace mineral supplemented yearlings gained an extra 20 pounds over the pasture season

The salt and mineral are often placed near watering areas or at key pasture locations to promote grazing in certain areas. Frequent moving will help to distribute grazing intensity throughout the entire pasture. Keep a record of salt and mineral consumption to determine if free choice offerings are providing meaningful supplementation. The supplement bag will give a guide on expected intake. To be meaningful intake should be at least 40 grams per day or one bag for 100 cows for one week.

BEEF 'N BACON

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Weigh the Risks

by Aileen Whitmore

Today people have the advantage of the safest food supply this country has ever known. They are healthier than ever before. Instead of becoming less concerned, however, the average individual has become more concerned about the risks associated with the foods they eat.

Often risks are perceived by consumers as serious but to the scientist they are virtually harmless. Studies of risk perception attempt to understand why people's concerns are increasing and why perceptions are so often different than what the experts say people should be concerned about.

One factor is that we have greater ability to detect minute levels of poisonous substances. We can detect parts per billion or parts per trillion or even smaller amounts of chemicals in water, food and air.

Secondly we rely on powerful new technologies that can have serious consequences if something goes wrong. When we lack familiarity with a technology we are naturally suspicious and cautious to accept associated risks. Fear of flying was far more prevalent 20 years age than today. First-hand experience calmed their fears making them more comfortable with the new technology.

Thirdly, risk problems are often brought to the public's attention and kept there by increasingly well funded and sophisticated special interest groups. They are skilled in getting their message to the public.

Finally, we are now being told that we have the ability to control many elements of risk, for example through wearing seat belts, changing our diets, or getting more exercise. Perhaps the increasing awareness that we have control over many risks makes us more frustrated and angered at exposure to risk that we have no control over such as air pollution, pesticides or food additives.

Perceived risk is a reality and has a great impact on our lifestyle. We have a responsibility to look beyond perceptions and sort out the facts, realizing that perceptions are legitimate. Keep food risks in perspective. Consider that the "dose makes the poison" and that foods such as carrots, parsley, cabbage, broccoli and raspberries all contain natural pesticides at higher levels than the amounts of man-made pesticide in plant foods. All plants produce their own natural pesticides to protect themselves against fungi, insects and predators. Thousands of natural pesticides have been discovered, and every species of plant contains its own set of toxins, usually a few dozen.

In This Issue

Vol. 6, No. 6, August 1991

Alberta
AGRICULTURE

Selling Feeders Off Grass

by Doug Walkey

Once feeder cattle are on pasture, the most important decision is how to sell them. Timing and selecting your market can mean a healthy profit or a sickening loss.

For example, let's take a small herd of 800 lbs. feeder steers on pasture in mid August. We are considering selling them. So what are our choices? We can sell them early, say in late August; we can sell them during the fall calf run; or we can hold them until after the calf run.

These three choices may sound simple, but they have dramatic effects. In fact, some choices may not be available to an individual operation. Holding the calves may require feed and pen space that may not be available. Similarly a lack of pasture or a cash flow problem may force selling the feeders in late August.

Early Sale The advantages of selling in late August are premium price, and conserved pasture. Looking at Table 1, August offers the highest price probability for the summer and early fall seasons. Removing animals early from pasture will leave more cover on the forage, allow the plants to build reserves before hardening, and promote more plant survival over winter. Another consideration, with a shorter grazing season, you may be able to pasture more animals on the same land.

Fall Sale The second alternative, selling the feeders during the fall calf run, has a few disadvantages. First, the sale comes during the busy harvest period. This often leads to delays and to the "market when it snows" strategy when prices drop sharply. Second, seasonal price trends are lowest during the latter part of September and October. Holding animals on pasture can have some production problems as well. Gains on pasture can be limited by pasture conditions into the fall, slowing average daily gains to a stop. Sometimes animals can lose weight as grass and carry over dwindles.

Later Sale Selling after the fall calf run so has its challenges. Animals must be put in a feedlot to maintain their rate of gain. As well, you will be selling a heavier animal, one you've started on a feedlot ration. Delaying the sale will mean more expenses, more work, a need for facilities, and possibly more profit.

If feedlot space is not available consider a custom lot. These allow you to maintain ownership while someone else worries about facilities, labour and feed. Custom lots have large numbers of animals available for sale, giving them an advantage at selling time, both in negotiation with buyers and with grouping lots of matched cattle.

Making The Decision Basing our example on price estimates from the Monthly, let's compare the alternatives for our example herd. We estimate the animals to weigh 800 lb. in late August, 830 lb. in late September off pasture, and 900 lb. in November.

Selling Our example feeders sold in late August return the same dollar that selling later in November promises. Given the extra work and the uncertain November price, we would seriously consider selling in August.

The September sale date returns the least in our estimate, and with good reason. Late September sales are subject to seasonal prices slumps for 8-900 lb. feeders. For the extra time we own the calves, we have additional costs for interest and pasture. Finally, the less productive fall pasture lowers the productivity and lowers the returns over the period.

Alternate Selling Comparison

Alternative	Sale Price	Sale Weight	Sale Costs	Additional Expenses	Net Returns
August Sale	$95/cwt	800 lb			$760 /Hd
September Sale	$92	830	$22.50*		$741
November Sale	$94	900	$82.50**		$764

* includes additional pasture and interest costs.

** inc. additional feed, interest, and feedlot induction.

Comparing alternatives for grass cattle is easy enough to do by hand, and can be aided by spreadsheet templates such as CalfBud3. For more information, obtain a copy of the fact sheet **Buy-Sell Economics for Feeder Cattle (Agdex 821-49)** from your District Agriculturist, Livestock Specialist, or Market Economist.

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Planning Pig Flow and Production

by Bert Dening

Pig production is like any other business. Without clear objectives and production targets it gets boring, lacks purpose and usually becomes less profitable.

Planning pig flow and production involves developing a work schedule that uses all the pens to capacity. Planning means setting targets for the number of pigs sold per month, weaned per month, litters born per month and breedings per month.

We have to start with the space available in the weaner barn and grower-finisher barn, because this will determine the total tonnes of pigs we can produce. A floor plan of the grower-finish and weaner barn is a good place to start. Using this floor plan determines the total living space (excluding self feeders, alleys, etc.) that can be used by pigs. As a rule of thumb a grower finish barn with pigs entering at 25kg (55lbs) and leaving at 100kg (220lbs) should have 7 square feet of living space per hog.

From this, determine the pig capacity, and using present growth rate (days in the barn) determine how many times the barn can be turned over. For example, a 600 head barn turned over 3 times (120 days in the barn) should be able to put through 1800 hogs a year. 1800 hogs a year divided by 52 weeks equals 35 finished hogs every week.

Now we can work out sow numbers needed based on selling 35 pigs per week. We have to wean 36 pigs per week (assuming 2.8% death loss) in order to sell 35 pigs.

In our example if we can wean 9 pigs/sow on average we need to wean and farrow 4 sows each week in order to meet our goal of selling 35 per week.

Knowing farrowing rate (number of sows that farrow out of 100 breedings) will allow us to determine how many to breed. In our example if the farrowing rate is 80 percent we would need to breed an average of 5 sows or gilts every week in order to have 4 farrow every week. Many farms fail to meet their breeding objective because they don't keep enough gilts on hand to fill in the gaps.

So how many sows does our operation need? If this operation weaned at 28 days, took an average of 7 days from weaning to breeding, and had a farrowing rate of 80%, it would need 109 sows in order to have 4 farrow every week. If the farrowing rate was 90% the operation would need 97 sows in order to have 4 farrow every week..

Sample Situation

Every pig farm is different. Some have too many farrowing crates and not enough finishing space. For others it's the reverse. So what is the most economical use of space in these situations?

For Example, if your problem is too many farrowing crates but not enough grower finisher capacity, there are three options:

1. Don't use the crates to capacity. This means keeping less sows than possible but keeping growing - finishing space full. This is a common situation but doesn't use space to capacity.

2.. You could keep the maximum number of sows and keep crates full and sell surplus pigs as weaners or finish pigs outside. If weaner prices are strong or there are good outside finishing facilities this could be the most economical.

As a thumb rule, with 4 week weaning you should be putting through at least 10 litters through every crate every year. So if you have 30 farrowing crates, 300 litters should be the target.

3. Usually you are better off to finish everything. In our situation if we did not sell weaners and we could not finish outside but still use our facilities to capacity we would need to use the farrowing crates as part time weaner pens. This would involve keeping weaners in the crates after weaning which results in heavier pigs entering and exiting the weaner barn.

This is usually the most economical situation, allows finishing of all pigs and uses all space to capacity with no overcrowding.

Conclusion

In theory this all sounds good, but we know the pig is a biological creature and things happen to throw a monkey wrench into our plans. But with good records and knowing yearly fluctuations of things like farrowing rate we can plan ahead so that facilities are full, but not crowded, at all times.

Remember the biggest single factor in financial defeat has been a high fixed cost ie. facilities, not turning out enough pigs.

Make Sure All Piglets Get Colostrum

by Marvin Salomons

On many farms there is a general failure to help the smaller and weaker piglets at birth. These smaller piglets weighing less than 1 kg at birth represent up to 15% of the litter. Pig producers lose nearly one piglet per litter within the first 24 hours of birth, representing nearly 70% of all the losses that occur prior to weaning. In many instances saving these piglets require they consume an adequate amount of colostrum soon after birth.

What's In Colostrum?

The first milk or colostrum has a very high solids content, the protein fraction being particularly high. Composition changes very quickly after farrowing to that typical of sow milk as shown in **Table 1.**

Table 1 **COMPOSITION OF SOW COLOSTRUM AND MILK**

	Time After Farrowing				
	At Farrowing	6 hrs.	12 hrs.	24 hrs.	3 days
Dry Matter (%)	30.2	26.6	20.8	20.6	23.2
Fat (%)	7.2	7.8	7.2	8.7	12.0
Crude Protein (%)	18.9	15.2	9.2	7.3	6.3
Lactose (%)	2.6	2.9	3.4	3.9	4.3

Perrin, 1955

The globulin fraction of the protein contains a rich source of antibodies -- protection the piglet obtains from the sow not unlike a good vaccine. There are three distinct immunoproteins:

- **Immune globulin A (IgA)** - protects internal surfaces from bacterial invasion (lungs, throat, gut linings)
- **Immune globulin M (IgM)** - protects against viruses and triggers immune responses to microrganism invaders.
- **Immune globulin G (IgG)** - is the most dominant immunoprotein **(Table 2)** providing whole body protection via the bloodstream against bacteria.

TABLE 2 IMMUNOGLOBULIN CONTENT OF SOW COLOSTRUM

IgG = 58.7 mg/ml
IgA = 10.7 mg/ml
IgM = 3.2 mg/ml

What's the Urgency?

Unlike humans, newborn piglets are not born with immunity against disease-causing bacteria. In addition, sows increase the number of pathogens in their own feces around farrowing time -- a natural process to challenge piglets as seen in the wild. Piglets react to the challenge by alerting their own secretory immune system in the gut lining to produce immunoglobulins. This prevents further absorption of toxins from pathogens that have been swallowed. The pitfall is this process takes several days, whereas the piglet needs protection within minutes after birth. Immediate protection can be provided by colostrum.

Providing the newborn piglet takes it quickly, (ie. within 2-3 hours or 4-5 good suckles), 40-60 g of colostrum will provide sufficient immunoprotein to protect it from most pathogen challenges. If a weak piglet is unable to suckle on its own it can be orally dosed using a syringe or stomach-tubed using a 10-inch section of soft flexible silicon tubing.

A sow can be milked and the colostrum stored. Two 20 cc doses of natural sow's colostrum can be stomach-tubed 1-2 hours apart. The process is easy enough and everyone should learn to do it. Several farms have reduced their morality by over 30%.

Based on: J.Gadd, PIGS, Nov/Dec'90.

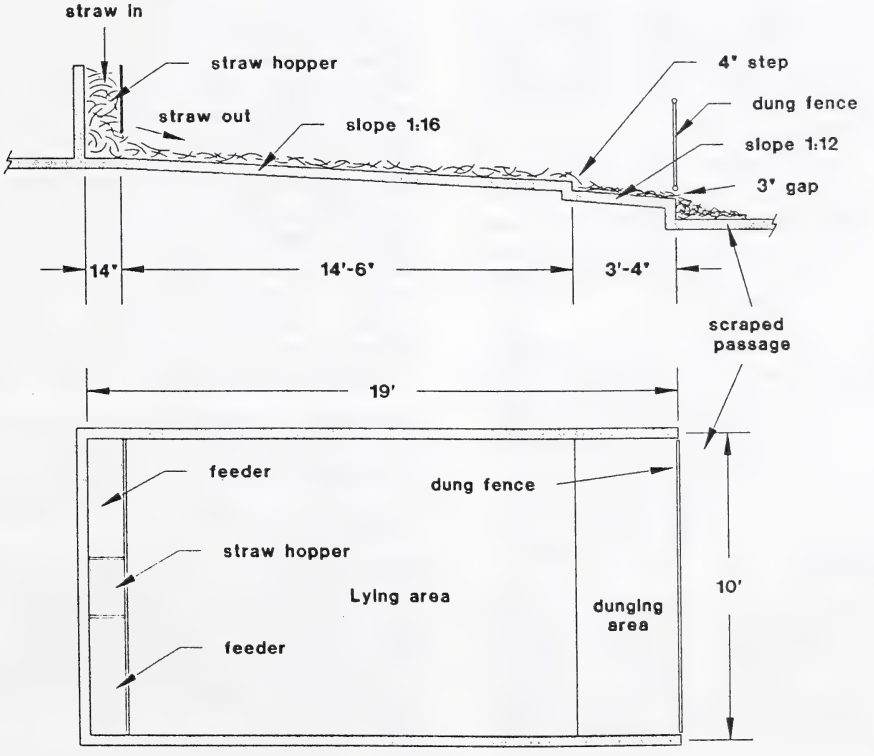
Straw-Flow Feeder Pens

by Robert Borg

Straw flow pens are an idea developed from work at the Centre for Rural Buildings in Scotland. They use straw, which contributes to a pigs thermal comfort and behavioral needs, but avoids the high labor requirements of deep bedded straw pens.

Long straw at a rate of 100g per pig per day (about 5 lbs per pen per day) for pigs over 20 kg is available in a simple hopper with a rectangular hole. Pigs pull straw from the hopper, manipulate the straw and gradually move the straw down the sloped pen over 24 hours. The straw combines with manure in the dunging area and is worked under the dung fence by the pigs feet. The pen shown has a capacity for 20-22 pigs.

- Construction cost will be less than slatted systems. Manure is scraped as a solid.
- Pens have operated up to one year without the upper slope needing cleaning.
- Pigs did not eat much straw. When straw drops from the hopper, pigs respond energetically and carry straw to other parts of the pen.
- Scores for bursitis were intermediate between deep straw systems and slats.
- Growth rates and feed conversion have been statisfactory, the operation was not disturbed by high stocking rates.



Wrapped Round Bales Store No Better Than Unprotected Bales

Reprinted From PAMI Notes

In a recent research project, conducted by the Prairie Agricultural Machinery Institute, round hay bales wrapped in plastic resulted in greater total feed losses (7.5%) than bales stored in a single row unprotected from the weather (6.4%).

The plastic wrap, which only covered the circumference of the bales, did not allow moisture that had penetrated into the bales to escape. As a result, considerable moisture collected in the bottom of the wrapped bales. This led to dry matter losses of 3.7%, resulting from deterioration of hay, and spoilage losses of 3.8%.

Spoilage occurred primarily in the bottom of the bales and was unfit for consumption. Minimal spoilage was evident in any other areas of the wrapped bales.

The bales stored in a single row unprotected from the weather resulted in minimal dry matter losses (0.8%) and spoilage losses of 5.6%. Spoilage in the bottom of these bales was also not fit for consumption by livestock.

In addition, some spoilage occurred on the exposed surfaces of the bales. This spoiled hay was of lower quality than unspoiled hay but would be consumed by most livestock. Given this data, no economic advantage of wrapping round bales with plastic was demonstrated.

Hay, consisting of 60% alfalfa and the remainder Timothy and Brome, was baled in July, 1989 using an expanding chamber baler. The hard core bales produced were stored using five storage treatments. The two wrapped bale storage treatments included bales wrapped using the Vermeer and the Unverferth bale wrappers. These machines wrapped the circumference of the bales with plastic and left the ends exposed.

Nonwrapped bale storage treatments included bales stored horizontally end to end in a single row, bales stored vertically with the bottom bale on its end and the top bale on its side, and bales protected from the weather in an enclosed building.

Bales were left in storage for 16 months in a well drained area during which time 17 in (425 mm) of rain was recorded. Total rainfall was less than the long term average of 24 in (600 mm) for this period. Dry matter weight, moisture content, and nutrient content of the bales were determined at the start and the end of the storage period.

From the data, the dry matter loss (the change in bale mass on a dry matter basis over the storage period) of each bale was calculated. The mass of spoiled hay for each bale at the end of the storage period was estimated and expressed as a percentage loss of the original bale mass. Finally, the total feed loss, the addition of the two above losses, was determined.

The greatest dry matter loss occurred with the wrapped bales which averaged 3.7%. The least dry matter loss occurred with the bales stored inside which experienced no apparent loss. The largest spoilage loss occurred with the vertical storage treatments which averaged 9.1%. Eighty percent of this spoilage occurred in the bottom placed bales.

The top bales did not completely cover the bottom bales. As a result, rain ran off the top bales and entered directly into the exposed ends of the bottom bales. This led to considerable spoilage. In addition, properly tied bales are important to prevent "mushrooming out" of the tops of the bottom placed bales to reduce the amount of rain collected by these bales.

The smallest spoilage loss of the outside storage treatments occurred with the wrapped bales which averaged 3.8%. The greatest total feed loss occurred with the vertical storage treatment which averaged 10.6%.

This project was supported by Agriculture Canada under the Agri-Food agreement, a subsidiary agreement of the Canada Manitoba Economic and Regional Development Agreement (ERDA). Manitoba Agriculture provided technical assistance to the project.

Supplemental Feeding of Yearlings on Pasture

by Dale ZoBell

As the summer progresses range condition often deteriorates due to weather, grazing pressure, plant growth patterns, etc. A well managed pasture often has an abundance of various grass species throughout the grazing period, but plant maturity results in lower nutrient availability due to higher fiber levels. The nutrients are present but in a form that is not readily available.

Supplementation of late summer grazing can be a management tool that will match pasture quality with animal requirements to obtain higher gains and greater feed efficiency. There are a number of ways this can be accomplished ranging from supplementing roughage, grain or a protein source.

Supplementing a relatively good quality roughage could be used to stretch a pasture that has excess pressure due to overstocking. This may not be an economical or practical choice, however and most range managers would advise against it except for emergency situations.

When grain is fed to yearlings on pasture, grain intake will increase with decreasing forage availability and quality. Yearlings self fed grain on pasture will consume approximately 1.5 lb. of grain daily per 100 lb. body weight on well-managed pastures (1.5% of body weight). This will vary however, depending on animal type, pasture condition and percentage of legume to grass. Studies indicate that stocking rates and pounds of beef per acre increased with grain supplementation.

Grain feeding can be accomplished either by daily hand feeding or in self feeders. Hand feeding may not be practical or desired but it allows for the greatest control of consumption levels. Hand feeding every second or third day may be a compromise for this situation. Self feeding can result in fleshy or over conditioned animals, depending on animal type and pasture condition. Salt can be added to restrict grain intake and the amount needed would depend upon the level of grain intake desired, the size of the cattle, the availability and palatability of pasture and the quality of water present.

Feeding grain at a rate of more than .5% of body weight to cattle on well managed pasture has a substitution effect on available forage.

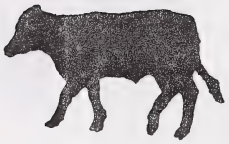
Since an animal can consume only a certain amount of dry matter a day, feeding grain will decrease the amount of forage consumed. Studies indicate that for every pound of grain consumed on pasture, .3 to .8 lb of forage is spared. If grain was limited to 1% of body weight then approximately 4.4 lb. of forage would be saved.

Studies indicate that stocking rates and pounds of beef/acre increased with grain supplementation.

Another alternative is the feeding of a high protein feed supplement. Studies in Oklahoma suggest that an additional .25 to .6 pounds of additional gain can be achieved by high protein supplementation. Feeding small amounts (1 lb/head/day or 2 lbs. every other day) to yearlings consuming low quality roughages, such as that found in late summer, increased forage digestibility and intake. This program only was successful, however when adequate grass was available. The U.S. researchers used cottonseed and soybean meal as their protein source, fed alone with the exception of small amounts of mineral and vitamins added. In Alberta soybean meal or a combination canola/soybean meal supplement should work. Past studies on suckling calves in Alberta have found that canola meal by itself is not as readily consumed as soybean meal.

Presently a study is underway in Alberta to determine the merits of supplementing a high protein meal to yearlings on grass. There may be an economic advantage over grain supplementation. The downside to this alternative is that this method also necessitates hand feeding as opposed to self feeding which is the preferred option if supplementation is carried out.

The material presented on grain supplementation is contained in a fact sheet by Alberta Agriculture titled "Supplemental Feeding of Yearlings on Pasture" and is availble at district offices. Contact your Regional Livestock Specialist for information on high protein supplementation.



Questions About Nitrate Poisoning

by Barry Yaremcio

What causes nitrates?

Nitrate is the form of nitrogen that the plant roots take up from the soil. It is transported to the leaves, and is converted to protein via photosynthesis.

Excess nitrates accumulate in plants when they are stressed by drought, hot dry winds, cool, cloudy weather or by hail or frost, such that photosynthesis is impaired. When any of these conditions exist within a few days of harvest or grazing, the potential for nitrate poisoning exists. The roots continue to supply the same amount of nitrate to the upper plant as prior to the injury. The upper plant is not able to use the nitrate as efficiently and it accumulates in the stem and leaves.

Nitrate levels remain high until new tissue growth is able to utilize the nitrate that is present. If the plant dies or is harvested, the accumulated nitrate stays in the plant material. It does not disappear with time.

Which plants accumulate nitrates?

Ceeals tend to accumulate greater amounts of nitrates than perennial forages. These crops are usually planted into well fertilized, manured or recently plowed grass land or pasture. Cereals are harvested at an early stage of development (milk to dough), when nitrate content is highest. Nitrate concentrations vary in different parts of the plant. The highest levels are found in the lower stems. Concentrations in the leaves and flowers are lower and the seeds or grain kernals are usually nitrate free.

What levels are safe to feed?

Nitrate levels may be reported as nitrate (NO3), nitrate nitrogen (NO3-N) or potassium nitrate (KNO3). Be sure you know which method was used before trying to interpret the results.

Nitrate Reporting Method and Safety Level

	%NO3	%NO3-N	%KNO3
Safe	<0.5	<0.1	<0.8
Caution	0.5-1.0	0.1-0.2	0.8-1.6
Problems	>1.0	>0.2	>1.6

When should crops be cut?

Nitrates accumulate with time in an injured or damaged crop. It is best to cut or harvest the crop as soon as possible after damage. Nitrate will accumulate in a plant as long as it is taking up more nitrate than it can convert to protein.

Other sources of nitrates?

Nitrate from sources other than plant material can be poisonous. Water runoff from feedlot grounds can be high in nitrite. Nitrate and nitrite can be found in well water. Some species of algae are nitrate producers. Ammonium nitrate and urea fertilizers, have been implicated in poisoning cases.

Can animals adjust?

It is not the animal that adjusts to high nitrate feeds but rather the rumen microbes. Rumen microbes convert nitrate to nitrite and finally to ammonia. It takes three to five days for the microbes to adjust to higher levels of nitrate. During the adjustment period, some of the microbes will die off slowing the rate of digestion. Once the microbial population returns to normal levels. digestion rates return to normal. This is why an adapted animal is able to handle higher levels of nitrate in a diet, but this does not make it easier to determine what is safe.

If animals are abruptly switched from a low nitrate level to a higher level, a buildup of nitrates an be expected before the microbes become adapted. It is important to provide a ration that contains relatively constant amount of nitrate.

Nitrates are released from a dry hay more rapidly into the rumen than from a fresh forage because many cell walls in the hay are ruptured during drying, allowing for a rapid release of cell contents. Thirty percent of the nitrate in a fresh forage is released in twenty minutes while eighty percent of the nitrate is released from a dry hay over the same time period.

For more information contact your veterinarian, district agriculturist, livestock specialist or the Alberta Soil and Animal Nutrition Lab at 427-6361.

Barry Yaremcio is the ruminant nutritionist at the Alberta Soil and Animal Nutriton Lab, Edmonton.

BEEF 'N BACON

A bimonthly publication from Alberta Agriculture Regional Offices in Barrhead and Red Deer

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Meeting Your Family Goals

by Bob Winchell

Managing your family farm business involves some complex issues. Normally the farm business is operated to support the goals of the farm family. Farm family goals may include such things as enjoying the lifestyle, maintaining a certain standard of living, achieving personal satisfaction, or transferring the farm to the next generation.

The first step is good communication among family members so that a common workable set of goals can be embraced by all family members. A profitable business is much better able to support family goals than is a non-profitable business. Many things affect the profitability of a business; some of them are beyond the control of the manager. The manager can control financial management practices such as recordkeeping, budgeting and analysis of income statements and balance sheets. These practices do not by themselves improve profit but they provide you with the information needed to make the decisions along the way to meeting your family goals.

Information increases your ability to control the direction of your business and reduces the feeling of helplessness which sometimes occurs when the business is being driven by outside forces.

Your accountant is a good place to go for some of this information such as accrual income statements and balance sheets in addition to the usual tax management assistance.

Alberta Agriculture staff can provide information and training in the use and understanding of several financial management practices:

Record keeping courses or individual assistance can get you going on a good double entry cash recordkeeping system. 'Gear Up Advantage' courses explain income statements, balance sheets, cash flow budgeting plus other topics. The Farm Financial Advisory Service provides an opportunity for you to discuss financial aspects of your operation on a one to one confidential basis.

Various leaflets and publications are available on topics such as estate planning, decision making, goal setting, communication, cost of production information, leasing arrangements and business arrangements.

Taking the time to check out some of these sources of information may be just what is needed to help you guide your business towards meeting your family goals.

In This Issue

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Alberta AGRICULTURE

Consumers Demand "Light"

by Aileen Whitmore

Light foods have come a long way since first hitting store shelves some 20 years ago. Back then, the small category of light foods (those low in sugar, fat and total calories) was labelled as dietetic and marketed in a single section of the grocery to a small segment of consumers. Only those on restricted diets or with medical conditions were considered customers for these products and, as such, light foods didn't command much attention from retailers or manufacturers.

Today, "light" has exploded into virtually every food and beverage category, from low-fat milks, cheeses and yogurts to high fibre, whole grain cereals, to no cholesterol cookies and baked goods. "Light" has been sparked by consumer demand. People are anxious to make healthy food choices. Recent surveys show that consumers are cutting back on high fat foods and are increasingly aware of nutritious eating habits.

Today, "light" has exploded into virtually every food and beverage category.

It may be easier to eat healthy, but that doesn't mean it's a simple task and that's because of the confusion that has arisen since light foods entered the mainstream. Just what defines a light, or "lite' food? Unfortunately, laws governing the way foods are marketed haven't kept up with the boom. In fact, light can refer to a product's weight, texture or colour, or it can signify what we expect it to - a product low in calories, fat or sodium.

Cholesterol can also be misleading on a label. While it exists only in animal fat such as butter and lard, products that never did contain cholesterol now have that fact splashed across their labels. The consumer's best defense is to read labels and ingredient lists to see exactly what is in a product.

Most retailers merchandise light products beside regular products throughout the store, and sales show this marketing method to provide the best results. Other merchants combine maintaining a shelf of sugar-free, low-fat products as well as featuring these same products in their respective categories around the store. The heavy exposure given to these foods is evidence that retailers are recognizing the tremendous public demand for light products.

The meat industry is also responding to the consumer demand for lite products, or products with less fat, cholesterol, calories and sodium. Processors who have recognized the trend have responded with leaner meat products. These products also represent a way to address critics and others concerned about the nutritional value of red meat.

Beef 'n' Bacon is published by Alberta Agriculture offices in Red Deer and Barrhead. More information on all articles is available by contacting your District Agriculture Office or the following:

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Health Comes First

by Bert Dening

Healthy pigs will often perform very well in a poor environment, but the converse of this is usually not true. A poor or average environment with disease problems such as mycoplasma pneumonia can together create poor performance, high feed conversion and greatly reduced profits. Good management, feed and environment can overcome a lot of disease problems but why not also add good health and get even better performance.

New Operations

One of the biggest mistakes I see new operations make is buying breeding stock that has a number of diseases that will effect performance (2-3 weeks prior to market). The health and genetics of the breeding stock you buy will do more to make you profit than the type of building you build (assuming the building is adequate).

Table 1 shows the economic impact disease can have. This example involves purchased feeder pigs. The mixed source would be auction market pigs or pigs purchased from a number of producers.

Table 1
Economic Impact of Disease in Finishing Pigs (180 lbs. gain)

	A Mixed Source	B Single Source	C Minimal Disease
Days to Market ($0.12/day)	135 ($16.20)	120 ($14.40)	100 ($12.00)
Feed Efficiency (feed cost $0.07/lb)	3.7 ($46.62)	3.4 ($42.84)	3.15 ($39.69)
Deaths & culls ($60/pig)	5% ($3.00)	3% ($1.50)	1.5% ($0.90)
TOTAL COST	$65.82	$58.74	$52.59
Improved return over A ($/pig)	---	$7.08	$13.23

Kislingbury, 1989

The single source pigs all come from one farrowing operation but would still carry some economically sensitive diseases. The minimal disease hogs would be healthy and free from a lot of diseases. This example shows that the healthy hogs return an average of $13.23 per head over the mixed source, assuming you paid the same price to start off with. This is an increased return of $13,230 for someone shipping 1,000 finished hogs a year.

Snout and Lung Report

Alberta Agriculture operates a swine herd health program which publishes snout and lung scores. These scores are one tool to identify potential healthy hogs. Low head and lung scores are desirable and usually indicate a healthy herd with regard to atrophic rhinitis and pneumonia. Do not rely totally on head and lung scores but consult with your veterinarian with regard to supply herds.

Health and Genetics

The argument often heard is that you cannot trade health for genetics. The assumption is that healthy pigs are not genetically superior. This can be true, but why not have both. There are plenty of suppliers of healthy hogs with good genetics.

Conclusion

If you are getting into hogs or are expanding take a long hard look at where you are going to buy breeding stock. Consult the head and lung reports, talk to veterinarians and take a very objective view of the source herd and shop around.

Do not go by looks, rumour or coffee shop talk. Remember, you can have very healthy looking hogs that still carry and harbor diseases which are masked by good management.

If you are buying feeder hogs try to find a single source and preferably healthy hogs. Consider all-in all-out production if at all possible. These approaches usually pay big dividends in the end.

Survey Pin-Points Marketing Practices

by Marvin Salomons

Meat quality is important to everyone involved in the pork industry. It does not matter whether you are a producer, trucker, assembler, processor or retailer assuring quality pork gets from the farm to the table means profits for you and the whole industry.

Types of Losses

Assuring quality pork not only requires good care and handling of the pig carcass but the live animal too. In the marketing process a number of losses have been identified as having a negative impact on the industry. Death losses enroute to market, live and carcass weight losses, trimming losses, along with meat quality problems are influenced by such factors as time of last feeding and watering, stress from poor handling, overcrowding, and mixing pigs. Producers, truckers and assemblers all play an important role in determining the extent of these losses.

What is the Current Situation?

In 1987, Agriculture Canada conducted a cross-Canada survey of 495 pork producers, 28 slaughter plants and all of the assembly yards. The results were recently reported by Dr. Jennifer Aalhus from the Lacombe Research Station at the 1991 Alberta Pork Congress. This survey pin-pointed management practices that producers, truckers, assemblers, and slaughter plants could target to improve the marketing process and hence meat quality.

Research has shown:	The survey showed:
1. Maximum feed withdrawal 18 hours prior to slaughter and minimum withdrawal 4-6 hours prior to transport optimizes both carcass and meat quality.	* Approximately 60% of pigs marketed in Canada do not have feed removed on the farm prior to slaughter.
2. No good reason exists for removal of water prior to shipping since additional weight losses occur due to dehydration.	* Only 8% of hogs marketed in Canada do not have access to water prior to shipping (in some cases up to 72 hours prior to slaughter).
3. Mixing of unfamiliar hogs often results in fighting and DFD (dark, firm, dry) pork. Bruising also causes carcass losses.	* While assembling loads on the farm 13% of hogs in Canada are kept separated by their original pen (20% of time in Alberta). Mixing occurs about 50% of the time at slaughter plants.
4. When improperly used whips, slappers and electric prods cause stress and depending on the extent or time cause DFD (dark, firm, dry) or PSE (pale, soft, exudative) pork.	* As hogs move from farms to assembly yards to slaughter plants the use of boards to move pigs decreases (86% to 29% to 3%, respectively). Electric prods are used 50% of the time on farms and 20% of the time at assembly yards and slaughter plants.
5. Long transit times result in carcass losses. A minimum of 1 hour of rest is necessary after transit to reduce body temperature to normal.	* Approximately 20% of pigs spend 13 to 24 hours in transit (some wait up to 4 hours for unloading). Approximately 9% are slaughtered within 1 hour of arriving at the plant.
6. Inadequate stocking densities on trucks, at assembly yards or plants can lead to heat stress, fatigue, fighting, death, and poor meat quality. Each pig should have 0.85 m^2 in a pen and 0.34 to 0.41 m^2 in transit (depending on temperature).	* On average all hogs are provided with less than adequate space (0.66 m^2 at assembly yards, 0.57 m^2 at slaughter plants, 0.32 to 0.34 m^2 in transit).

A Low Tech Temporary Pig Barn

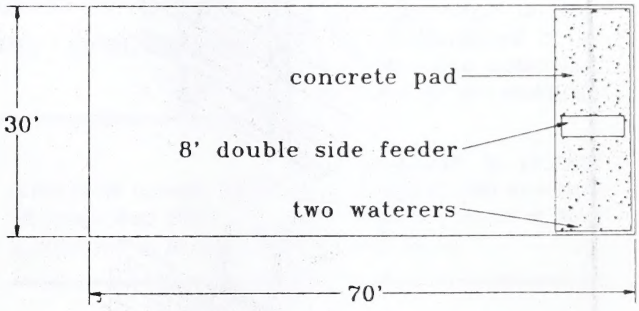
by Robert Borg

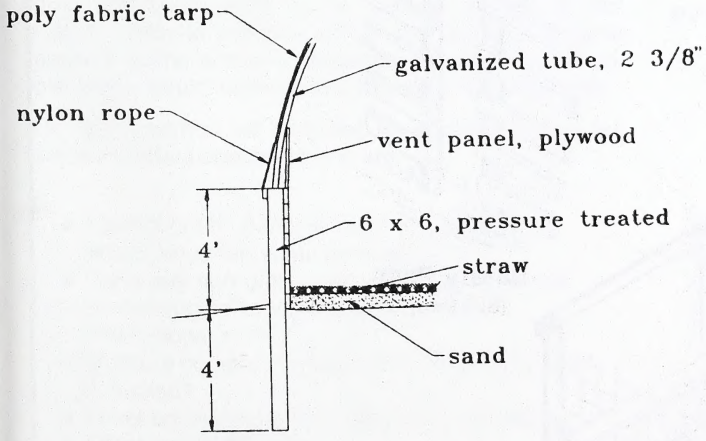
One example of a low technology structure that could be used as a temporary or emergency pig barn is the Biotech Shelter. The shelter is constructed from galvanized steel arches supported on treated 6x6 posts. The cover is an ultraviolet protected aluminum coated woven polyethylene fabric imported from Japan. The tarp is fastened to the structure with 3/8" nylon rope. Life expectancy of the tarp is 10 years.

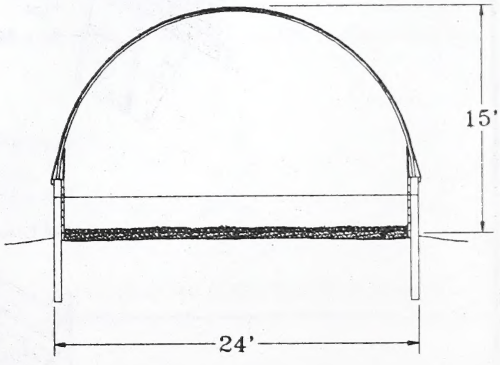
A typical structure of 30 x 70 can hold 150 pigs as an all in-all out pig barn. Use sand instead of clay or gravel as a base for a straw bedded floor. Clay gets too wet and the pigs root out the stones in a gravel base. The structure is ventilated from the side spaces between the tarp and the foundation and from the end walls. The ends of the building are covered with flaps made of the same material as the roof.

The cost of the shelter will be about $8,000 which works out to $3.80 per square foot or $3.40/pig place/year based on a 20 year life and tarp replacement in 10 years.

Three of these shelters are being used for finishing pigs on a farm near Guelph. Consdier this building as a temporary or emergency shelter as it cannot provide the optimum year round environment but it does provide low cost alternative housing.



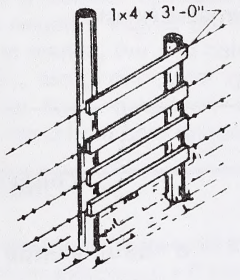


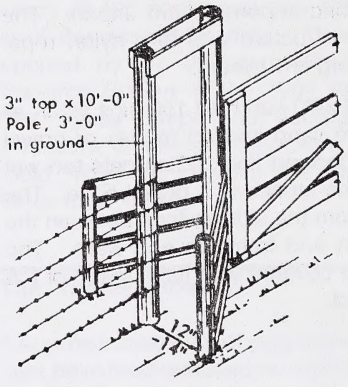


Stiles and Passes

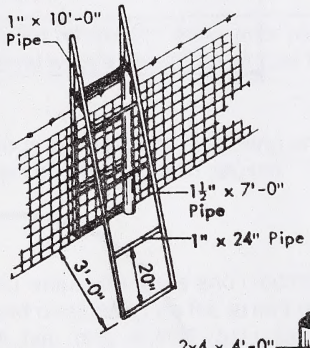
by Wayne Winchell

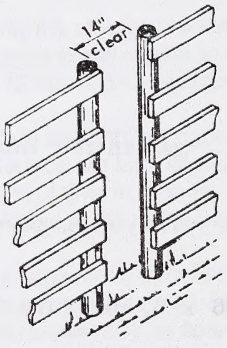
There are a number of situations in which it is easier to get through a fence by using a man-gate or stile than to be opening gates or jumping or climbing over the fence. These are a few ideas.

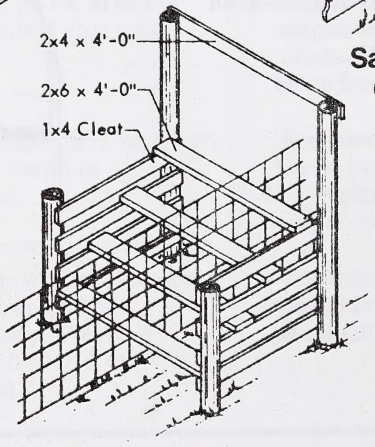




Man Pass







Safety Pass
(Bull Pen)

Processing of Grain

by Dale ZoBell

Grain processing can have a large impact on cattle feeding profits. The primary reason for this is due to increases or losses of feed efficiency, depending on the form in which the ration is presented.

Feed efficiency, which is defined as the amount of feed required per pound of gain, should be the prime consideration for producers considering processing their grain. In finishing rations, where grain may constitute as much as 90% of the ration, and represents 70 to 80% of the total cost of gain, feeders must be aware of factors that affect feed efficiency.

Feed efficiency should be the prime consideration for producers considering processing their grain.

Many processing methods have been developed by past research. The oldest and most widely used methods for processing grains are those which merely cause physical disruption of the kernels by mechanical means. The fact that more nutritious portions of the grain are surrounded by an outside coating or hull makes it easy to understand how the exposure of these portions to the action of digestive enzymes and microbial action would increase the utilization of the nutrients.

No single method will be suited for all cattle feeders but some important considerations are:

- Type of grain. Barley is more responsive to processing than some other grains.
- Uniformity and quality of finished product. Will processing influence the amount of fines, separations, etc?
- Moisture content of grain. Can the grain be self fed if desired?
- Effect on feed efficiency. Will it be cost effective?
- Effect on cattle health.
- Will carcass yield or grade be affected?

The method most used by producers in Alberta is dry rolling and to a lesser extent grinding through a hammermill. Rolling has been found to be relatively cost effective and animal performance is similar to other methods of processing.

Tempering, or the reconstitution of moisture, has recently come into favor again. Research has shown that tempering reduces dust, improves gains and has a positive impact on animal health. Studies have shown a 5 to 10% increase in feed efficiency over dry rolling. Capital expenditure on sophisticated equipment is not necessary and a system can be tailored for an individual's operation.

Is it necessary to process grain in all cases? Research has shown that in almost all cases feed efficiency, hence cost per pound of gain, is improved as shown in the following table.

PERCENTAGE IMPROVEMENT IN UTILIZATION OF WHOLE GRAIN BY PROCESSING*

	CALVES (Under 300 kg)	CATTLE (Over 300 kg)
Oats	0-5	0-10
High Moisture Barley	4-8	5-10
Dry Barley	12-16	14-20
Wheat, Rye & Triticale	20-40	30-40

* Source-Alberta Agriculture Cattle Nutrition Manual

In summary, processing of grain can improve the feeding value of a feed by improving digestibility, palatability and ration consumption which improves the bottom line or cost per pound of gain. Further information can be obtained from your feed company, nutritionist and Alberta Agriculture.

Researchers Tackle Consumer Issues

by Robert Hand

Consumers and producers are both concerned that livestock production practices be conducted in a humane manner. As such, a Canadian beef code of practice was developed and will early next year be distributed to producers. Already, the Cattlemen's magazine has printed a portion of the code.

Hot iron branding castration, and dehorning are particular livestock practices of interest to consumers. Consumers also wonder whether cows are in fact green. Researchers are tackling these issues. Here is a summary of a research report on castration and an update on how much methane cows emit.

Castrate Early

by B. King, R. Cohen, C. Guenther and E. Janzen,

University of Saskatchewan

Suckling beef calves were castrated at either an early or late (2 weeks before weaning) age by either surgery (a newberry knife and emasculator) or burdizzo. Plasma cortisol levels of castrates were compared to bull calves at 2 minutes, 3, 6, 12, 24 and 30 hours after treatment. Plasma cortisol levels are used as an indicator of physiological stress. Plasma cortisol increases anytime the animal is handled, restrained, temporarily removed from dam or experiences fright or tension. For example, plasma cortisol levels would increase as an animal spends more time in a chute.

The following table shows that age of castration had a significant influence on the level of stress experienced by the calf. There was no difference between method of castration at an early age. However, older calves were stressed more by the surgical method than the burdizzo.

The Mean Level of Plasma Cortisol in Early and Late Castration Groups

	#	Age of Castration	Plasma Cortisol (ug/litre)
Early	70	78 ∓ 12d	9.7 ∓ 1.6
Late	72	167∓14d	23.7 ∓ 2.7

The researchers commented that at an early age, removal from the dam and restraint of young calves during the castration procedure caused as much or more immediate stress than castration per se. They concluded that:

- Castration of calves up to 78 days of age caused minimal physiological stress but at 167 days it caused significant stress.
- Stress following burdizzo castration was less than that following surgical castration for older calves.
- Delaying castration until 2 weeks before weaning resulted in no growth advantage.

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Methane Update

Earlier calculations overestimated methane gas emissions for cows and its effect on global warming. Two Cornell university resource economists D. Chapman and T. Drenner as reported in Feedstuffs magazine suggest that earlier estimates ignored how livestock recycle carbon. By eating hay and grain, cattle actually remove carbon dioxide from the atmosphere and if their manure is properly handled, cows can return carbon to the soil. That is, ruminants could become an overall sink for carbon dioxide. This is far different than burning fossil fuels which release carbon in to the atmosphere. The economists suggest that one cow has the same global warming effect as a 75 watt light bulb operating for an entire year. Replacing incandescent light bulbs in industrialized countries with 18 watt fluorescent bulbs would provide as much light and go much further in reducing the future impact on the climate than regulating bovine emissions.